

UNIVERSAL
LIBRARY

OU_166732

UNIVERSAL
LIBRARY

OSMANIA UNIVERSITY LIBRARY

Call No. 656 F 33 T. Accession No. 14568

Author Fenlon, K. F.

Title Transport co-ordination

This book should be returned on or before the date last marked below.

TRANSPORT CO-ORDINATION

TRANSPORT CO-ORDINATION

A study of present-day Transport Problems

BY

K. G. FENELON, M.A., Ph.D.

Lecturer on Economics in the University of Edinburgh
Author of "The Economics of Road Transport"

LONDON :
P. S. KING & SON, Ltd.
ORCHARD HOUSE, WESTMINSTER
1929

Th
M.A.F.

PREFACE

THE rapid development of motor transport during recent years has been responsible for the emergence of a number of important problems among which questions concerning its future relationship to the older forms of transport have been especially prominent. Much discussion has recently centred around the possibilities of the co-ordination of the various forms of transport as a solution of this problem, but so far there does not seem to have been any attempt in book form to analyse the nature, advantages and limitations of co-ordination. It is in the hope that the following pages may provide, however inadequately, such a survey of the subject that the Author ventures to present them to the public.

The present work has arisen out of a paper read by the Author before Section F (Economic Science and Statistics) of the British Association for the Advancement of Science, at the Glasgow Meeting in 1928, and the Author desires to thank all those who have encouraged him to amplify and extend the material then presented.

Where possible the Author has attempted to acknowledge his indebtedness to other writers by references in the footnotes. For information concerning current developments, he is indebted to various technical journals, including, among others, "Modern Transport," "The Tramway and Railway World," "The Bus and Tram Journal," "The Railway Gazette," "Motor Transport," "The Commercial Motor," "The World's Carriers," "The Aeroplane," "The Times Trade Supplement" and the "Manchester Guardian Commercial."

The MS. and the proofs have been read over by the Author's wife and his father, and to their care he owes many improvements.

CONTENTS

CHAPTER	PAGE
PREFACE	7
I INTRODUCTION	15
II THE ECONOMIC CHARACTERISTICS OF THE VARIOUS TYPES OF TRANSPORT AND THEIR RESPECTIVE ECONOMIC SPHERES.	
The Railways	19
The advantages of rail transport	19
The importance of overhead costs	20
Reactions of trade depression on railway traffic	22
Other advantages of rail transport.	23
Electric Railways	24
Electric Tramways	25
Motor Transport	27
Advantages of road transport	27
The growth of road transport	30
The sphere of road transport.	31
Road transport rates and fares	33
Benefits conferred on the Community by road transport	34
III ECONOMIC CHARACTERISTICS (<i>continued</i>).	
Inland Waterways	36
The advantages of inland water transport	36
The limitations of canal transport	37
The Grand Union Canal merger	37
The Coasting Trade	39
Air Transport	41
The economic sphere of air transport	43
Summary	46

CHAPTER		PAGE
IV	COMPETITION BETWEEN ROAD AND RAIL TRANSPORT.	48
	Railway traffic losses and road competition .	51
	Road and rail competition in the United States	58
	The economic effects of loss of traffic by railways	61
	Is road competition fair competition ? .	63
V	THE ECONOMIC BASIS OF CO-ORDINATION.	67
	Co-ordination in the past	69
	Practical difficulties	70
	Types of co-ordination	71
	Voluntary co-operation	74
	Co-ordination through railway ownership or control	74
	Statutory co-ordination	76
	The control of motor bus licences	78
	Parliamentary limitations on competition .	80
	The limitations of transport co-ordination from the point of view of the Public .	82
VI	THE RAILWAYS AND ROAD SERVICES.	85
	Post-war developments	86
	The Railway Companies' Road Transport Acts, 1928	87
	Railway motor bus services	89
	The railways and goods carriage by road .	94
	Combined road and rail services in rural districts	95
	Railhead delivery	97
	Containers	98
	Bus and railway stations	99

CONTENTS

II

CHAPTER	PAGE
VII ROAD AND RAIL CO-ORDINATION ABROAD .	101
Co-ordination in the United States . . .	101
Co-ordinated passenger services . . .	101
Freight transport co-ordination . . .	104
Containers	105
Regulation of road transport in the United States	106
Co-ordination and the regulation of motor transport in Ireland	107
Road and rail transport in Germany . . .	109
Road and rail co-ordination in other countries	109
VIII CO-ORDINATION BETWEEN OTHER TYPES OF TRANSPORT.	112
Air Transport Co-ordination	112
Inland Water Transport and the Coasting Trade	115
IX CO-ORDINATION OF PASSENGER TRANSPORT FACILITIES IN GREAT CITIES. . .	117
Passenger traffic co-ordination in Greater Paris	118
Transport co-ordination in Berlin . . .	119
Co-ordination in Vienna	123
Co-ordination in American Cities . . .	123
The Passenger Transport Problem in London	124
The London Traffic Act, 1924 . . .	129
The Advisory Committee's Report . .	132
INDEX	139

STATISTICAL TABLES

TABLE	PAGE
I. NUMBER OF MOTOR VEHICLES IN USE IN GREAT BRITAIN, 1904-27 . . .	30
II. NUMBER OF MOTOR VEHICLES LICENSED ON AUGUST 31ST, 1921-27 . . .	30
III. NUMBER OF MOTOR VEHICLES REGISTERED IN THE UNITED STATES . . .	31
IV. TONNAGE OF FREIGHT CARRIED BY MOTOR TRUCKS IN CONNECTICUT, 1925 . .	33
V. NET TONNAGE CARRIED BY MOTOR TRUCKS	33
VI. APPROXIMATE MILEAGE FLOWN ON THE AIR TRANSPORT ROUTES OF THE WORLD	42
VII. APPROXIMATE AIR TRANSPORT MILEAGE FLOWN IN DIFFERENT COUNTRIES . .	42
VIII. COAL, COKE AND PATENT FUEL TRAFFIC ON BRITISH RAILWAYS . . .	49
IX. RECEIPTS FROM COAL TRAFFIC (FOUR GROUPS)	49
X. NUMBER OF WORKMEN'S TICKETS ISSUED	50
XI. GENERAL MERCHANDISE TRAFFIC CARRIED BY BRITISH RAILWAYS . . .	52
XII. PASSENGER TRAFFIC ON BRITISH RAILWAYS (ORDINARY TICKETS)	53
XIII. SEASON TICKETS. (EQUIVALENT NUMBER OF ANNUAL TICKETS)	53
XIV. PASSENGER JOURNEYS. (PERCENTAGE OF TOTAL)	53

TABLE	PAGE
XV AVERAGE RAILWAY RECEIPTS PER MILE	54
XVI L.M.S. PASSENGER RECEIPTS ARRANGED IN MILEAGE ZONES	55
XVII PARCELS AND MISCELLANEOUS TRAFFIC	57
XVIII AVERAGE LENGTH OF HAUL ON BRITISH RAILWAYS	61
XIX RATES FOR ROAD, COLLECTION AND DELIVERY OF AGRICULTURAL AND OTHER BULK PRODUCE	96
XX CHARGES FOR ROAD CONVEYANCE OF SUNDRY TRAFFIC	96
XXI MOTOR BUSES OPERATED BY CLASS I RAILROADS IN U.S.A., 1927	102
XXII NUMBER OF PASSENGERS CARRIED IN GREATER BERLIN	122
XXIII BERLIN TRANSPORT UNDERTAKINGS. TRAFFIC STATISTICS, 1927	122
XXIV NUMBER OF PASSENGERS CARRIED WITHIN A RADIUS OF 25 MILES OF CHARING CROSS	124
XXV NUMBER OF PASSENGERS CARRIED ANNUALLY IN GREATER LONDON	125
XXVI NUMBER OF VEHICLES EMPLOYED IN GREATER LONDON	125
XXVII AVERAGE NUMBER OF ANNUAL JOURNEYS PER HEAD OF THE POPULATION OF GREATER LONDON	126
XXVIII AVERAGE NUMBER OF RIDES PER CAPITA IN THE BIG CITIES OF THE WORLD	127

CHAPTER I

INTRODUCTION

IMPROVEMENT in the means of transport and communications has been an outstanding feature of recent economic development. Since the war, motor transport has made extraordinary progress ; commercial aviation has been born, and the railways, after shaking off the inertia of the war years, have made determined efforts to improve their technical equipment ; even the canals, moribund for some eighty years, have caught the infection of the new era of progress. In all the transport industries, there is at the present time a strenuous endeavour to reduce costs and increase efficiency.

Such striving after lower costs and greater efficiency is the very essence of a progressive economy and it is the moving force by which improvements are effected. Material progress depends on these attempts to obtain a maximum production at a minimum real cost. If theoretical conditions are postulated as to the mobility of capital and labour, such improvements will be adopted as soon as it is proved that one system or one method of operation is better than others, though in actual practice there are all kinds of hindrances and considerable economic friction. Fixed capital, which cannot be transferred to other types of production, will not readily be abandoned since that might mean a total loss to the owners of such capital.

In the transport industries, progress takes two forms. There is first the tendency to substitute one type of transport for another. In the eighteenth century, canals largely superseded roads for heavy traffic and even for passengers transport in certain districts ; in the nineteenth century, railways superseded canals, while in the twentieth

century the road is in turn attracting traffic from the railways.

In the second place, the internal economy of particular types of transport is continually being improved. On railways, for instance, technical improvements such as new signalling methods, automatic appliances, bigger locomotives, etc., may be adopted, while sometimes an entire revolution may take place as when electric traction is substituted for steam operation.

Progress cannot be effected without upsetting the old equilibrium and it is a notorious fact that transitional periods are beset with practical difficulties. Since the war, technical, economic and financial instability has had to be faced by the transport industries. In the young industry of motor transport, keen competition and uneconomic "rate cutting" has played havoc with many of the new ventures; the air transport companies, optimistically inaugurated after the war, have had to pass through the hard school of experience and at times have been in acute financial difficulties; while the railways have had to face a period of severe depression, more serious than any previously experienced in their hundred years of operation.

Transport development has had reactions also in many other directions, as witness the problems of road maintenance, traffic congestion and street accidents, which problems have arisen as the result of the rapid progress of road transport.

The transport problem of to-day has been greatly complicated by conditions altogether outside the control of the industries themselves. Economic causes have had a considerable influence, especially important being the effects of trade depression in the heavy industries. This depression has had severe reactions on railway traffic and finance. At a time when they have had difficulty in retaining their traffic in passengers and merchandise, the railways have suffered from declining traffic in coal, iron, steel and the other products of the heavy industries.

The demand for improved transport.—To-day the transport industries are confronted with an insistent public

demand for better facilities. In the first place cheaper and better transport, it is argued, would be an important factor in the revival of the depressed industries and agriculture. In the second place, recent changes in our national economic equilibrium, such as the greater development of internal markets, have led to a demand for improved internal transport. So also have changes in social habits, *e.g.*, the growth of the travel habit, improved minimum standards of living and changes in fashion. Traders now work with smaller capital and shorter credit, while fluctuations in demand have increased the tendency to carry small stocks. They have therefore come to rely on rapid transport facilities to replenish their stores as need arises.

These changes have been well described by Sir Josiah Stamp in an address to the Institute of Transport.

"This is an age in which we are learning the immense economic gains of dealing with commodities in the mass and not in excessive detail and yet at the same time, upon railways we are experiencing an economic revolution in the opposite direction. The number of consignments of handled traffic per ton appears to be approximately three times what it was before the War. The general explanation is that owing to the changes in the price level and its more rapid fluctuation, the retailer and small dealer will no longer keep a considerable stock, for his capital will not run to it, nor is he prepared to suffer the risks of fluctuation in price and he throws these back upon the merchant and producer. He therefore orders little and expects, or depends upon, immediate delivery, whereas formerly his stock tided him over for several days."¹

In the United States a similar tendency is evident.

"Before the World War, goods were customarily purchased and shipped in comparatively large quantities, frequently in car-load lots by retailers and wholesalers whose usual practice was to keep large stocks of goods on hand. Orders were placed well in advance and stocks were not then turned over so quickly as they now are. The shortage of many kinds of goods during the war and the inability of manufacturers to maintain production equal to demand brought about a change in trade methods. . . . Relatively small stocks of goods, fast delivery and rapid turnover are becoming salient features of distribution in the United States."²

¹ "Journal Institute of Transport," Vol. 9, No. 9, p. 494, July, 1928.

² Johnson, Huebner and Wilson, "Principles of Transportation," p. 380.

Transport improvements, it would seem, increase the desire for yet better facilities. Faster passenger services are being demanded ; more frequent services are desired ; rapid delivery of goods is insisted upon and at the same time traders have adopted a policy of ordering in smaller lots. Such demands have in many cases increased the operating and financial problems to be faced by the various transport administrations.

Rapid, cheap and efficient transport can confer great benefits on all members of the community, while on the other hand, inadequate, costly or inefficient transport adversely affects every individual. But if the transport industries are to render the best service to the community, they must be placed on a sound financial and economic basis. At the present time, it is generally agreed that the transport situation is in many ways unsatisfactory and that the best use is not being made of the facilities available. The chaotic condition of passenger transport in many of the larger cities is a problem of considerable magnitude by itself, while especially acute is the question of the relationship of the new road transport to the railways.

CHAPTER II

THE ECONOMIC CHARACTERISTICS OF THE VARIOUS TYPES OF INLAND TRANSPORT AND THEIR RESPECTIVE ECONOMIC SPHERES

The Railways

IN Great Britain, as in most other countries, railways still constitute the backbone of inland transport facilities. Generally speaking, rail transport is unrivalled for long distance journeys ; for the carriage of the raw materials of industry and for handling nearly all kinds of heavy or bulky articles, especially those which pass in quantity. In certain circumstances the railways can provide direct services from the private siding of one factory to that of another, or from pit to port, and where such direct transit is possible the economic advantages of rail transport are at a maximum. Road vehicles, except in a few instances, are not suitable for the handling of heavy, or long distance goods traffic. Nor can they cope successfully with intensive passenger traffic.

The advantages of rail transport.—Railways speeds are greater than those of motor transport, except where the average is reduced by terminal, transhipment or other delays. The speed of heavy road vehicles must be limited in the interests of public safety and to prevent excessive damage to the roads. This advantage of speed is one which the railways in all probability will find necessary to exploit to the maximum. Already the tendency is to speed up freight trains and during the past few years there has been a considerable increase in the number of express braked goods trains. Where road transport is countered by the provision of special facilities and fast services, the railways have been able to retain, or even

regain traffic, *e.g.*, mails, fish, newspapers and other merchandise carried by passenger train or equivalent facilities. A particular example may serve to illustrate this contention. Some years ago traffic between Leith Docks and Glasgow was largely carried by motor transport, but this was regained by the railway when they reintroduced a braked goods train service (the "11.55 a.m. South Leith and High Street Conditional"), which had been withdrawn during the war.

An important innovation designed for the purpose of attracting traffic was the publication in 1928 by the L.N.E.R. of the first goods train time table. This provides traders and others with full particulars of available fast trains, so that they may be in a position to avail themselves of the services best suited to their requirements.

Over long distances, the railways also have a great advantage for passenger traffic, since a long journey by motor bus is very tedious. In recent years, however, both in Britain and the United States, there has been a remarkable growth in the number of long distance bus routes, but the popularity of these services is to be explained by the lower fares quoted by the buses. Over long distances, limited competition has also to be faced from air transport, but at present this is confined to high grade traffic.

The importance of overhead costs.—In regard to the handling of bulk traffic, the railways are considerably superior to road transport though there is some competition from inland waterways and coasting vessels for low grade traffic where slow transit is no great drawback. Railways are especially well suited for the handling of bulk goods and mineral traffic and also for intensive passenger traffic, since not only can large volumes of traffic be easily and expeditiously carried on a few trains but costs tend to decrease as traffic increases. Railways are subject in a very marked degree to the economic law of decreasing costs, since the outstanding features of railway capitalisation are the great amount of capital necessary and the preponderance of overhead charges. In Great Britain,

railway expenditure on capital account had amounted to £1,181,320,000 by 1923, while in the U.S.A. the present value of the railroads has been estimated at some \$22,350,000,000 or about £4,470,000,000. In 1923 the annual gross receipts of British railways amounted to £224,443,000 or about one-fifth of the capital outlay. It thus takes a railway about five years to turn over its capital.¹

This capital has been spent for the sake of the traffic as a whole and it is a very difficult matter to allocate the cost of carriage against any particular type of traffic, much less against particular consignments.² Hence railways in the past have imposed differential prices for different classes of traffic. Valuable commodities such as silk, cigars or fruit, which presumably can bear higher rates, are charged more per ton-mile than low grade traffic, such as coal and iron, which could only be transported in bulk, if rates were low. In other words all traffic must bear any additional or out-of-pocket expenses to which it gives rise, but the overhead charges are distributed so that the valuable traffic contributes more per ton-mile than low grade traffic. The charging of differential prices was possible, since railways had a partial, albeit a regulated, monopoly. Where competition was serious, *e.g.*, from canals or coasting steamers, the principle tended to break down and "Exceptional" or Special Rates had to be quoted. In recent years, road competition, by attacking the higher grades or classes of traffic, has tended to a far greater degree to break up the system of classification, as witness the large number of exceptional rates in force at the present time despite the recent increase in the number of classes. In the same way the railways have been forced to grant numerous cheap fare facilities to meet motor bus competition. The variety and number of such reduced fare facilities have now become so extremely

¹ Before the War, it took nearly ten years to turn over the capital, but the changes in the purchasing power of money since then have altered the ratio. (C. E. R. Sherrington, "Economics of Rail Transport," Vol. II, p. 37.)

² See W. M. Acworth, "Elements of Railway Economics."

complicated that a general reduction of all passenger fares to 1d. per mile has been advocated in some quarters as the only way to get rid of the anomalies and complications of the system.

From the fact that a railway requires a large capital, the greater part of which is fixed and invariable whatever the amount of the traffic carried, it follows that costs per unit of traffic considerably decrease if traffic increases.¹ The running of excursion trains supplies an illustration of the economy of heavy traffic. The extra expense of running such a train is small and thus it may pay a railway company to carry passengers at very low rates (*e.g.*, the 24s. excursions between London and Edinburgh) provided large numbers of passengers are attracted and the ordinary full fare traffic is not unduly diverted to the cheaper trains. An American Economist, Professor J. Maurice Clark, in a monograph on the subject of overhead costs, emphasises the fact that unused productive capacity, or capacity of which full advantage is not taken, is at the bottom of the complexities involved in the study and practical applications of the principle of overhead costs, "Idle overhead," he says, is simply the expense side of this unused capacity.

"So far as railroads were concerned the chief use made of the notion of overhead costs was to justify discrimination as a general practice, on the ground that added traffic was not responsible for these costs which did not increase as traffic increased, and that in any case, it was impossible to determine the proper share of costs traceable to one shipment or unit of business."²

Reactions of trade depression on railway traffic.—Since the War, the railways have suffered greatly from trade depression in the heavy industries, *e.g.*, coal mining, iron and steel manufacture and shipbuilding. Mineral traffic is considerably below the 1913 level, but the costs of working mineral lines, coal discharging plant, rolling stock,

¹ An exception occurs at the point where traffic outgrows line capacity. When this happens, extra capital outlay is involved and costs increase with a jump. But as traffic continues to increase, costs again begin to fall.

² *J. Maurice Clark, "Economics of Overhead Costs,"* p. 10.

etc., cannot be decreased in proportion. If, however, a revival were to take place in the prosperity of those industries, the reverse effects of the law of decreasing costs would come into play through the better utilisation of idle capacity, and in such circumstances railway finances would be greatly improved.

Other advantages of rail transport.—In addition to the advantages possessed by railways as regards speed and the handling of bulk traffic, they have an important asset in their widespread organisation for the collection and distribution of traffic.¹ The railways are nation-wide in their ramifications, being second only to the Post Office in the extent of their organisation. The magnitude of railway enterprise in Great Britain is not always fully realised, so perhaps a few statistics may not be out of place. British railways have a capital considerably exceeding one thousand million pounds and employ some 683,000 persons. They operate 20,400 miles of route, own nearly 24,000 locomotives, 51,000 passenger vehicles and 718,000 goods and mineral rolling stock, apart from handling some 25,400 privately-owned wagons. Their ancillary enterprises are also important, and in 1927 they owned 178 steamships, totalling 74,907 registered tons, some 555,000 feet of quay, 1,051 miles of canals and 82 hotels.

Road mileage is nearly ten times as great as railway route mileage, but there is no national organisation of road transport, and it has not even been found possible to build up a system of freight exchanges or road transport clearing houses. In the U.S.A. there has, however, been a considerable development of motor transport Freight Offices.

“Nearly every city and town served by motor trucks in independent operation has one or a number of these offices, which are in effect the focal points of the motor freight or express lines operating between the cities and towns and the surrounding territory.”²

Inland waterways in Britain are almost completely unorganised and in any case they serve only a limited

¹ The L.N.E.R. alone has some 2,500 stations and Goods depots.

² G. Lloyd Wilson, “Motor Traffic Management,” Ch. 3, p. 21.

area of the country. Air transport in Britain looks to Europe and the Empire, not to internal traffic, and thus so far there has been little competition with British railways, though in Germany an important and powerful air transport company—the Lufthansa—has been built up and in time it may prove a serious competitor to the railways in that country.

The possession of almost unique facilities for the collection and distribution of traffic by British railways should be an important factor in the operation of their new road services, while it should also be a valuable instrument in carrying out negotiations with independent road transport concerns. Railway stations and goods depots, where suitable, could be used as a basis for the organisation of combined road and rail transport facilities.

Electric Railways

The capital cost of electrified railways is even higher than those of steam operated lines, because elaborate overhead wires or third-rail systems with the necessary feeders, sub-stations, etc., have to be provided. In consequence electrification is in general only justified where traffic is heavy, as for example on suburban lines. Electric operation, however, has certain technical and operating advantages over steam traction, such as greater acceleration, increased braking power and absence of smoke. Headways can be reduced in consequence of the greater acceleration and braking power and thus an increase in the number of seat-miles available at rush hours can be effected without the duplication of tracks—an important consideration in suburban areas. It is claimed, however, by the L.N.E.R. that in their East London suburban area steam trains can give as good a service as electric. There the operation of steam trains has been reduced to a fine art and a remarkably heavy traffic is handled at the rush hours. This example demonstrates that the margin in favour of electric operation is small, though in general electric traction is preferred for heavy suburban services.

Other advantages of electric traction are the ease in reversing trains at terminals, the more rapid crossing of fouling points at junctions and the possibility of proportioning operating costs more readily to the amount and fluctuations of traffic. The absence of smoke and dirt is another great advantage, and for this reason electric working has now become universal for underground services. In New York, an important railway has been forced to adopt electric traction in and out of its terminal station to obviate the smoke nuisance.

In Britain, experience has proved that the displacement of steam by electric trains is only justified where the traffic is exceptionally heavy. Though little or no progress has been made in main line electrification in this country, there has been considerable progress in the electrification of suburban sections ; the most notable example being that of the Southern Railway Company, whose suburban electric railway system is now the largest in the world.

In other countries, circumstances are often more favourable to electric operation than in Great Britain. Cheap electric power, for instance, has been an important factor in the development of main line electrification on the Swiss Federal, the Midi, and the Italian railways. In mountainous districts electrification has considerable advantages, since the severe gradients permit of the regeneration of current on the downward sections. Long tunnels in mountain regions also make the use of electric traction desirable.¹

Electric Tramways

The electric tramway, though it shares the road with other vehicles, presents economic characteristics more akin to those of a railway than road transport. It is tied to a fixed track and adopts the principle of a steel wheel on a steel rail. Moreover the construction and operation of a tramway involves a considerable capital outlay per

¹ For an account of the economics of electric traction on railways see *C. E. R. Sherrington, "Economics of Rail Transport," Vol. II, Ch. XI, pp. 230-248* ; and *P. Burtt, "Railway Electrification and Traffic Problems."*

route mile and overhead charges consequently constitute a preponderating proportion of the total cost of transport. The ordinary street tramway, however, suffers from the limitations of both road and rail transport, since it shares the roadway with other vehicles. Unlike the railway, it has no exclusive right-of-way, and unlike the motor bus, it is confined to movement along a fixed route. To overcome these limitations there has been a tendency to lay down open sleeper tracks, fenced off from the roadway, where this is possible, *e.g.*, in Newcastle, Hull and Liverpool.

Competition from motor buses has been very severe in many districts ; but it would seem that a modernized tramway can still hold its own where traffic conditions are favourable. The great advantage of the tramway is its capacity for handling heavy traffic, since tramcars have considerable seating capacity and can provide for a heavy overload. Though the large fixed capital involved in tramway construction places it at a disadvantage unless traffic is considerable, costs decrease when traffic increases and tramways are thus suitable for handling large volumes of traffic. Where traffic is heavy, as in London and Glasgow, it has been found possible to quote very cheap fares over long distances, and tramways also provide specially reduced fares for workmen ; this being a statutory obligation. Minor advantages of the tram are its considerable powers of acceleration and the possibility of operating in fog and snow. Tramways also maintain a large portion of the roadway and contribute considerable sums to local rates through assessments on their track and equipment. They claim, like the railway companies, that they are thus handicapped as compared with their motor bus competitors.

Motor buses have considerable advantages over tramways, except where traffic is exceptionally heavy and as motor buses increase in size, even the main advantage of the tram is tending to grow less and less marked.

The tramcar lacks mobility, whereas a motor bus has complete freedom of movement on the road and the

service is not interrupted by the breakdown of any vehicle. Where traffic is insufficient for a tramway, it may prove ample to justify a service of motor buses. Finally, tramways are weak in competitive power since their capital cannot be transferred from one route to another and any loss of part of their traffic brings into play the reverse effects of decreasing cost.¹

Motor Transport

In Great Britain the road leads everywhere. Motor transport is very flexible and in consequence a more individual type of service can be given than with any other type of transport. Inland waterways, tramways and railways, wide though the ramifications of the latter, can only provide facilities at special points or along their line of route, and therefore with these systems there is a certain degree of rigidity. With road transport, on the other hand, door-to-door services can be provided, and goods can be picked up and delivered under more diverse conditions and more easily than is possible with any other type of transport. The road vehicle is free to go to any part of the country where traffic is to be had. If one route does not pay, another may be tried. With a railway or a canal, on the other hand, if the route proves unprofitable, the capital sunk in its construction is for the most part incapable of movement elsewhere and thus the expenditure is wasted.² For passenger transport, the motor vehicle has the advantage of being able to draw up at the side of the kerb. It can pass, or be passed by other traffic going in the same direction and this greater mobility gives it considerable advantages over tramcars, which are tied to their fixed line of route.

Terminal or transhipment delays may be eliminated by using road transport for direct door-to-door services.

¹ For a more complete account see the author's "Economics of Road Transport," Ch. XII, pp. 143-162.

² In Edinburgh a quaint use has been found for a disused tunnel by a mushroom grower, but even such minor utilisation of abandoned railway capital is unusual.

Owing to the reduced handling, delicate articles are less likely to be damaged when sent by road. For the same reason and because consignments are under the control of the one person during transit, the risk of pilferage is reduced. Railways, it is true, pay compensation for loss through pilferage or damage (with certain exceptions in the case of Owner's Risk rates), but claims are troublesome and traders value immunity from the troublesome necessity of making claims. Packing costs may be reduced when motors are used and in certain trades this may result in considerable savings. Again with road transport, especially where a manufacturer or trader has a private fleet, vehicles can be dispatched as required and there is no need to consider train time-tables. These various advantages are often of great importance and may indeed sometimes offset a higher cost of carriage.

Road transport services can be started with comparatively little capital and the vehicles may even be obtained on the hire-purchase system. They can be successfully operated where traffic would be altogether too light for a railway. The unit of operation is the single vehicle, not a whole system as with canal or rail transport, and the amount of capital required is therefore small. Because the unit of operation is small, motor buses can be employed to give a service of greater frequency than would be possible with steam trains of the usual type. To meet competition of this nature the railways are experimenting with light steam units, such as the *Sentinel-Cammell* or *Clayton Rail Coaches*; with diesel-electric cars such as those employed by the *Canadian National Railway* or with petrol vehicles such as those utilised by the *Goische Steam Tram Company* in Holland, or by the *Great Southern Railway of Ireland*.¹ The petrol engine has not, however, proved so well adapted as steam for rail traction. In this country the steam rail coach has proved the most successful form of light vehicle

¹ The N.E.R. some years ago experimented with a motor bus mounted on flanged wheels, but no special type of petrol car was developed as a result of the experiments. A very early example of the use of petrol motors on railways was the petrol rail car which was operated by the L.S.W.R. in the Guildford area.

where passenger traffic is scarce, but the substitution of rail coaches, though they may serve to reduce loss, cannot be expected in all cases to solve the problem of unremunerative branch line working. Station staffs, signalmen (unless the branch is operated on the principle of one engine in steam) and other employees have to be retained and thus the costs must remain higher than with road vehicles. Difficulties have also been experienced by the railways in operating rail coaches, since a reserve of power is required when occasional horse-boxes have to be lifted or when the train requires to be strengthened at certain hours to cater for heavier traffic. Nevertheless the rail coach would seem to be an important contribution to the solution of certain operating difficulties on railways and it is to be hoped that the experiments will be continued.

Motor buses have another important advantage over railways, since they can stop to pick up or set down passengers at any point *en route*. They can run into the very centre of the towns and can reach outlying villages, whereas railway stations may be some distance away. On cross-country routes, involving changes at various junctions, rail travel is often tediously slow and in such circumstances road transport can provide a far better service. Frequently also motor buses can give direct services, whereas the rail route may be circuitous. Thus the G.W.R. has introduced a bus service between Moreton-hampsted and Kings Tor, by which the distance is reduced to little more than 15 miles, though the rail journey used to involve travelling a distance of over 60 miles with two or three changes *en route*. A curious example of shorter routes by road is provided by the *Belfast and County Down Railway Company*, which is in the peculiar position that the distance between any two stations in the district which it serves is shorter by road than it is by rail.¹

Mechanical road transport has proved a severe competitor to the railways because of its advantages of flexibility and mobility; its amenability to control; the smaller unit of operation; the greater frequency of service thereby made

¹ *J. C. Conroy, "A History of Railways in Ireland,"* p. 363.

possible; the more individual type of service which can be provided and the small capital required.

The growth of road transport—The striking growth of the new mode of transport is illustrated in the following table:

TABLE I

Number of Motor Vehicles in Use in Great Britain
1904-1927.

Year	No. of vehicles	Year	No. of vehicles
1904	45,000	1916	345,000
1905	56,000	1917	276,000
1906	67,000	1918	189,000
1907	80,000	1919	271,000
1908	92,000	1920	551,000
1909	101,000	1921	871,000
1910	114,000	1922	926,000
1911	152,000	1923	1,132,000
1912	193,000	1924	1,326,000
1913	243,000	1925	1,537,000
1914	307,000	1926	1,718,000
1915	321,000	1927	1,889,000

Since 1921 more complete figures have become available through the returns relating to motor taxation. Analysis of these figures shows that there is a marked seasonal trend mainly due to the greater use of motor cars and cycles during the summer months, since vehicles are often laid up in winter to escape taxation.

TABLE II

Number of Motor Vehicles licensed on 31st August, 1921-1927.

Quarter ending 31 Aug.	Motor Cars	Motor- cycles	Commer- cial motors	Motor Hackneys	Miscella- neous	Total
1921	242,500	373,200	128,200	82,800	44,082	870,782
1922	314,769	377,943	150,995	77,614	54,652	925,973
1923	383,525	430,138	173,363	85,965	58,574	1,131,565
1924	473,528	495,579	203,156	94,153	59,932	1,326,348
1925	579,901	571,552	224,287	98,833	62,767	1,537,340
1926	676,207	629,648	248,367	99,077	64,992	1,718,291
1927	778,056	671,620	274,651	95,676	68,723	1,888,726

In the United States, the growth of motor transport has been phenomenal, especially as regards the number of private motor cars. There competition with the railways is most severe in the case of passenger traffic.

TABLE III

Number of Motor Vehicles registered
in the United States. (Jan. 1st.)

Year	Number registered
1895	300
1900	13,824
1905	77,988
1910	468,497
1915	2,445,666
1920	9,231,941
1923	15,092,177
1924	17,591,981
1925	20,000,000
1926	22,001,393
1927	23,127,315

The sphere of road transport.—The position occupied by motor transport in our national systems of transport is an intermediate one. On the long haul and for the carriage of passengers in large numbers or of commodities in bulk, the railway is still definitely supreme. On the other hand over short distances, say up to 3 or 4 miles, horse transport is frequently the most economical for goods traffic. In the U.S.A. it would seem also that the horse is still holding its place, as the latest census in 1920 indicated that there were more horses then in service in the United States than in 1900. Frequent stopping and starting make the motor vehicle expensive on very short hauls, while delays are more serious since the capital value lying idle is much greater in the case of a motor than in that of a horse and cart. It would seem that the new petrol tax, the heavier license duties and the rise in the price of petrol in 1929 have tended to increase somewhat the economic sphere of horse transport. The electric battery vehicle to some extent is encroaching on the horse van for town collections

and deliveries and similar traffic, but its progress has been slower than its merits would seem to deserve.

The lower limit to the sphere of motor transport is clearly very largely a matter of costs, though the higher limit is only in part set by strict financial considerations. Costs naturally are the most important factor, but there may be other considerations to be taken into account. Limits vary according to the possibility of getting return loads on the different routes, though generally these difficulties increase as the journey is lengthened. On the long haul, the speed of rail transit is generally much greater, as on the short haul terminal delays may increase the journey time by rail. If a road vehicle takes more than a day to complete a trip there is little or no advantage as regards speed, since from most stations the railways can give delivery the following morning. Costs also tend to increase if a motor vehicle has to be garaged away from home and if the driver and his mate have to be put up for the night. In exceptional circumstances, motor transport may be preferred for long hauls, obvious examples being rush orders, special freights and furniture removals.

It is of course impossible to dogmatise as to the exact sphere of motor haulage as so much depends on the circumstances of the particular haul, though roughly the special field for mechanical road haulage appears to lie between 4 or 5 miles on the one hand and 40-50 miles on the other, but this may be increased when the traffic is suited to van loads and when return loads can be obtained.

Some very interesting figures prepared by the Bureau of Public Roads, United States Department of Agriculture, relating to motor van and lorry traffic in Connecticut in 1925 show that in the United States the same considerations as to the sphere of road transport hold good. These statistics show that motor transport is used most extensively for the carriage of manufactured goods, *i.e.*, articles of high value in proportion to weight and bulk. More than three-quarters of the tonnage was carried less than 30 miles.

TABLE IV

Tonnage of freight carried by motor trucks in Connecticut, 1925.

Mileage Zones	Agricultural products	Animals and products of animals	Mineral products	Forest products	Manufactured products	Totals
0-9	2.8	2.9	7.5	2.3	20.8	36.3
10-19	1.7	2.1	1.4	0.8	13.2	19.2
20-29	0.9	1.3	0.2	0.6	8.6	11.6
30-39	0.5	1.0	0.2	0.3	7.1	9.1
40-49	0.2	0.6	0.1	0.1	3.0	4.0
50-59	0.4	0.4	0.1	0.1	3.6	4.6
60-69	0.1	0.2	0.1	0.1	1.7	2.2
70-79	0.2	0.4	0.1	0.0	2.0	2.6
80-89	0.0	0.1	0.0	0.0	0.6	0.8
90-99	0.1	0.1	0.0	0.0	0.8	1.0
10 miles 1d over	{ 0.3	0.3	0.0	0.4	7.6	8.61
otals ...	7.2	9.4	9.7	4.7	69.0	100.0

The Bureau of Public Roads has also published information relating to the tonnage carried by motor trucks in other States and in the following table these results are summarised.

TABLE V

Net Tonnage carried by motor trucks.

State	Less than 30 miles	More than 60 miles	More than 100 miles
Connecticut ...	67.1	15.2	8.6
Ohio ...	64.2	15.9	7.6
California ...	58.1	21.2	13.5
Pennsylvania ...	77.3	6.9	3.3

Road transport rates and fares.—Comparing road transport charges for goods and merchandise with those of the railways, it is found that under certain circumstances and for moderate distances these may be lower than rail charges. The road can compete as regards rates most easily in the case of commodities placed high in the railway classification.

¹ Presumably special freights sent by road to secure expeditious delivery.

Most road hauliers in this country are not "common carriers" and they pick and choose their traffic, taking the more valuable and rejecting the lower categories. The road transport concerns generally, though by no means invariably, charge flat rates based on mileage and tonnage, irrespective of the nature of the consignment. Since overhead costs are not a preponderating influence, and since competition is on the whole usual, charges are generally based on the cost of service. Certain variations in rates according to the nature of the consignments are sometimes enforced. An obvious example of such variations is that made when commodities load badly. Different charges per ton-mile may also be enforced for small lots, big consignments and full lorry loads, as the cost of service is greater for small lots than for full loads. Charges are also frequently tapered, but somewhat less sharply than railway rates, the lowest rate per mile being quoted for distances of about 40 to 50 miles. Tapering is sometimes effected by charging separately for mileage and adding a fixed charge to cover terminal expenses, irrespective of the length of the haul.

In regard to motor bus fares, the attraction in the case of short distances is largely the greater convenience of the service, as on short journeys the railways generally compete strongly with their reduced fare tickets. On the long haul, however, the attraction of the motor bus is entirely that of a cheaper fare.

Benefits conferred on the community by road transport.—Road transport has considerable economic advantages over rail where traffic is light. Traffic quite insufficient to support a railway may easily suffice to give continuous and remunerative employment to a motor vehicle. The development of motor transport since the war has opened up the country to an extent never before possible and it has quickened the economic life of many of the remoter parts of the Kingdom. It is stimulating a more intense internal economic activity throughout all parts of the country, and in this respect it would appear to be working in the same direction as other present-day economic

tendencies. It is helping in the centrifugal distribution of industry and population. Formerly factories had to be located near railway stations or along the line of railways or canals. Now, however, the most suitable site can be selected quite irrespective of its distance from stations or canals. City workers can live outside the town, while rural dwellers have had the attractions of the towns brought within their reach. In the United States, similar advantages have been gained by the development of motor transport.

"The motor truck, bus and private passenger car have made a rich contribution to the economic and social welfare of the United States. Farm production has been increased. Isolation has been taken out of country life. The producers of raw material have been assisted in bringing the products of remote sections to market or to railroad or steamship depots. The motor has aided mining and manufacturing, expedited the delivery of raw materials, the moving of goods within the industries and the distribution of products. Local deliveries from retailer to consumer have been quickened. The whole process of production and distribution has been facilitated.

"The private motor passenger vehicle has extended the social and business activities of millions of people, while the passenger bus has become a part of the transportation system of virtually every city and town."¹

In both Britain and the United States, and to a less extent in other countries, motor transport has come to play an important part in the economic life of the different countries and in consequence any unduly oppressive legislation or the imposition of unduly heavy burdens would not be in the public interest.

¹ *Johnson, Huebner and Wilson, "Principles of Transportation,"* p. 372.

CHAPTER III

ECONOMIC CHARACTERISTICS (*Continued*)

Inland Waterways

INLAND water transport is provided by rivers, lakes, navigations (*i.e.*, canalised rivers), ship and barge canals. The diversity of facilities implies considerable variations in size and character, ranging from "narrow canals" in Britain, which are suitable only to the smallest of horse-drawn barges, to the Great Lakes of America or important rivers such as the Rhine. In England an extensive system of inland waterways was built up before the railway period ; the network being closest in the Midlands, where practically all the industrial towns are connected by canals. The inland waterways of England and Wales comprise some 1,930 miles of canal, 1,310 of navigations and 810 miles of open rivers, giving a total of 4,050 miles, as compared with 153,000 miles of road and some 16,000 miles of railway. The amount of traffic carried is not very considerable and has been declining since the beginning of the century. In 1906, traffic (excluding that on the Manchester Ship Canal) amounted to about $37\frac{1}{2}$ million tons, but during recent years it has fallen to between 15 and 16 million tons. Of this traffic about 10 million tons are carried by a few canals, viz., the Aire and Calder, the Birmingham, the Bridgewater, the Grand Junction, the Shropshire Union and the Trent Navigation.

The advantages of inland water transport.—The main asset of inland water transport is cheapness. Little power is required to move heavy weights through water since the resistance is low, probably one-fifth of the average resistance offered by rails. The necessary dead weight which has to be hauled is small and insurance premiums

are moderate since there is little risk of damage to cargo.

It is frequently possible to load and unload cargoes direct to and from sea-going vessels, since barges can often approach ships lying in an estuary. Lighterage and dock dues can thus be eliminated. Canal competition helps to keep down railway rates along the line of route, and this competition, it is argued, serves to stimulate efficiency. Canals are well suited to carry heavy commodities of low value, when speed is not important.

Limitations of canal transport.—It must be admitted that inland waterways suffer from serious limitations, which have been increased by the modern tendency of traders to demand rapid services and quick deliveries. Considerable time is involved in the negotiation of locks, which may be numerous in hilly country ; but it is seldom found possible to provide mechanical substitutes, such as hydraulic lifts or inclined planes, owing to the cost of installing and working such contrivances. The supply, control and pumping of water often present difficulties and may involve considerable expense. Drought may be experienced in summer, while in winter ice may impede navigation.

From the commercial point of view slowness of travel is the most serious defect of inland water transport ; but it is difficult to increase speed since the wash is likely to cause damage to the banks. On the Aire and Calder, the Weaver and the Trent Navigations, trains of barges drawn by steam tugs have been successfully employed, but the weak construction of the greater number of our canals prevents the utilisation of mechanical power and so the old fashioned horse-drawn barge is still generally employed.

In addition to these natural limitations, British canals suffer from certain other drawbacks. There has been practically no co-ordination and consolidation of the various local systems, which were planned piecemeal in the constructional period, almost without relation to each other. There is no uniformity of depth, width, general

conditions, or in the dimensions of locks, tunnels or over-bridges, and at least two main classes of vessel are in use on different canals, *viz.*, 60 feet barges 14 feet broad, and narrow boats about 70 feet long but only 7 feet wide. These latter, usually gaily painted craft, are colloquially known as "Monkey Boats." Canals built to suit one kind of boat are generally unsuitable for other types, and thus only the smallest barge can navigate over any distance. On the Continent and in the New World 600 ton barges are usual, whereas in Britain the maximum is often below 100 tons and may fall as low as 40 tons.

Organisation is generally deficient on British canals; through tolls for traffic passing from one canal to another are not readily available; few canals act as common carriers and there is no regular system of collections and deliveries. Of the 150 canals and navigations constructed since 1760, not more than 15 have acted as common carriers and at the present time only three continue to do so. In the Majority Report of the Royal Commission on Canals of 1906-09 it was stated that railway ownership was a contributory cause of canal decadence. The 1,050½ miles of railway-owned canals, it was maintained, are important links in the canal system as a whole, but it was not in the interest of the railways to foster canal traffic.¹

The cause of deficient organisation among canal companies is partly historical and partly due to lack of enterprise. As the Royal Commission stated: "With few exceptions, waterways stand to-day as they stood in the middle of the nineteenth century." Since 1850 the modernisation, extension and consolidation of existing canals has been almost completely neglected.

The Grand Union Canal merger.—Recently the Regent's Canal and Dock Company (founded 1812), the Grand

¹ It is only fair to state, however, that railways were forced in their early days to buy up certain canals as the price of acquiescence in the Bills promoting the railways. Railway canals are generally as well maintained as those of independent concerns, as this is a statutory obligation, and it is indeed probable that the railways would be glad to be rid of many of their canals as they do not pay their way.

Junction Canal (formed 1793) and the Warwick and Birmingham Canal have been amalgamated into the Grand Union Canal—a name with an old-world flavour, reminiscent of the period of the hey-day of canal navigation. This is the first important amalgamation since a few isolated consolidations were effected before the railways achieved their final victory over the canals. The combined canals have a mileage of 240 miles and a capital of $3\frac{1}{2}$ million pounds. The new company is tackling its various problems with considerable vigour; dredging is continuously being carried out and where necessary, concrete pilings and wallings are being put in. Power appliances and labour-saving devices, such as power-driven capstans and pile drivers, are being adopted where possible. A power-capstan installed at a lock has proved so successful that it is intended to standardise this appliance for speeding up traffic at congested points. A new type of boat is being experimented with and there are possibilities that power-driven craft will be adopted on long distance hauls. Already a considerable increase in coal traffic for gas works and power stations situated on the banks has taken place.

In view of the fact that this amalgamation is the first for many years, and on account of the initiative which is being displayed, the new venture is of great interest and it should serve to test the present-day possibilities of canal transport. It is possible that in the near future various improvements may be effected in our canal system, as the Minister of Transport intimated during the summer of 1929 that the Government favoured a policy of canal amalgamation and development.

The Coasting Trade

Before the coming of road motor transport, the main competitor of the railways, other than inland waterways, was the coastwise steamer. It has been said that coastwise shipping forms the British counterpart of the canal and river traffic of certain parts of the Continent. Ships,

though slower than rail transport, provide a very economical means of transit and they are especially suited to the carriage of low-grade, bulk cargoes, such as coal or grain. Very low rates can be quoted for bulk cargoes, and between ports such as London, Glasgow, Liverpool, Leith and Newcastle, a considerable amount of traffic is carried by coasting vessels. As is attested by the old name "Sea Coal," such traffic between Newcastle and London is of very long standing.

During recent years, entrances in the coasting trade of Great Britain (excluding trade with Ireland) have averaged between 15 and 20 million net tons. Though important in itself, this figure is very small when compared with the traffic handled by rail and road. Competition between railways and coasting vessels is naturally limited, since it is only effective on a few routes and is also largely confined to low-grade traffic sent in bulk, when quick delivery is not essential. To meet such competition it has been the practice of the railway companies to quote "exceptional rates" on the routes affected, though this has frequently led to complaints from the proprietors of coasting services. To safeguard the coasting trade, provisions were inserted in the Railway Act 1921, empowering the Rates Tribunal to revise any such "exceptional rates." Shipowners and the authorities of the large ports where the bulk of overseas traffic is handled attach considerable importance to coastwise distribution, as it facilitates the working of ocean steamers.

The Balfour Committee on Industry and Trade¹ in their Final Report urged that steps should be taken to revive some of the smaller ports and to resuscitate the coastwise trade, as they considered that this would benefit British trade. The process, they considered, should be materially assisted by the growth of road transport in the neighbourhood of these ports.

"Until this revival takes place it can hardly be said that all readily available means of cheap transport of goods are being used to the best advantage."



Air Transport

In 1919, the first commercial air service was initiated, and since that year commercial aviation has made astonishing progress.¹ Air services have been established in nearly all parts of the world, and in each succeeding year new routes are being opened up. In Europe, practically all the more important cities are connected by air transport, and in 1927 regular services, running to schedule, were operated over some 18,000 miles of route. Outside Europe, the greatest development has taken place in the United States, Australia and Canada. In the Spring of 1929, a new phase of commercial aviation was inaugurated by the commencement of services on the first British Empire air route from Croydon to Karachi in India.

In an official document, prepared for the Imperial Conference of 1926, the development of commercial aviation was very well summarised and as this development has continued, the description then given is applicable to-day.

“Year by year the routes have grown longer, the amount of flying has increased, better machines have been produced, ancillary organisation has developed, traffic has expanded, safety and regularity have improved. In general, the commercial aeroplane has emerged from the experimental stage and has proved itself a practical instrument of fast transport.”²

The rapid expansion of the new mode of transport is illustrated in the following figures, which give the approximate mileage flown on the regular air routes of the world. (Note, Flying on *regular* routes only is included.)

¹ In pre-war days a few isolated attempts were made to develop commercial aviation, the most successful being the inauguration of airship services in Germany. The outbreak of war, however, put a stop to the experiments.

² “The Approach Towards a System of Imperial Air Communications,” p. 8.

TABLE VI

Approximate mileage flown on the air transport routes of the world.

Year	Mileage flown	Year	Mileage flown
1919 ...	1,170,000	1924 ...	8,190,000
1920 ...	2,270,000	1925 ...	12,480,000
1921 ...	4,300,000	1926 ...	17,170,000
1922 ...	5,500,000	1927 ...	20,700,000
1923 ...	6,430,000		

TABLE VII

Approximate air transport mileage flown in different countries.

Country	1924-25	1926	1927
	Miles	Miles	Miles
Australia...	262,895	417,970	453,580
Belgium ¹	160,000	144,000	223,600
France ...	2,249,000	3,244,000	3,755,000
Germany...	1,860,000	4,065,000	6,189,000
Britain ²	890,000	840,000	769,000
Holland ...	482,000	510,000	589,000
Italy ³ ...	—	325,000	808,000
Poland ...	124,000	557,000	692,000
Russia ...	288,600	585,000	845,000
Sweden ...	69,280	165,000	155,000
Switzerland ...	268,400	210,000	196,000
U.S.A. ...	2,220,700	2,635,000	5,101,000

A remarkable record of safety has been attained on the regular air transport routes of the world, and in many countries, notably Great Britain, Australia, Sweden and Czecho-Slovakia, there have been remarkably few accidents to passengers travelling by air.⁴

Perhaps the most interesting feature of the development

¹ Includes Belgian Congo.

² Mileage figures affected in case of Great Britain by the adoption of larger machines.

³ There were no commercial air lines in Italy till 1926.

⁴ For an account of the methods and precautions adopted to ensure safety on the air routes, see a paper read by the author on "Commercial Aviation" to the Scottish Section of the Institute of Transport, Journal Institute of Transport, Vol. X, p. 180.

of commercial aviation in the various parts of the world is the fact that progress has taken different forms in different countries. In the U.S.A. the chief development has been long distance air mail services operated by day and night ; in Canada it has been survey work, forest fire patrols, map making, etc. ; in Germany it has been the interest displayed by local government and local commercial interests ; in France it has been the success of the trans-Mediterranean routes to Africa ; while in Britain it has been the inauguration of Empire routes which has been sought.

The greatest development has undoubtedly taken place in Germany, though in this development government subsidies have played a more important part than in Britain. Commercial aviation in Germany with a few unimportant exceptions is in the hands of one company—the Deutsche Lufthansa A.G. There is hardly an important town in Germany which is not linked by air transport services, while in addition almost every capital in Europe can be reached by air from Berlin. Germany is very well situated, geographically and industrially, to be a centre of the European air routes, and this no doubt has been an important factor in the development of German commercial aviation.

Britain on the other hand is in the nature of a terminal for international and Empire air routes rather than a centre from which the routes could radiate. If, however, the giant airships which are now being experimented with prove commercially successful for the operation of trans-oceanic services, which are too long for aeroplanes or flying boats, Britain may in the future become a centre for long distance air travel. The short distances and the efficiency of British railways tend to prevent the development of internal air routes within Great Britain.

The economic sphere of air transport.—Compared with the older forms of transport, air communications possess the important advantages of greater speed and independence of the nature of the terrain over which they operate. Speed is often a vital consideration and commercial aircraft

can readily average 100 miles an hour. It would seem that the older methods of transportation have already attained their maximum economic speed and that any appreciable acceleration could only be obtained at a cost out of proportion to the benefit obtained.

By means of air transport, however, greatly accelerated transport facilities can be provided at a not disproportionate cost.

Aeroplanes can make unbroken journeys over land, sea, desert or mountains and without hindrance from lakes, swamps or rivers. Thus the delays, inconvenience and expense of transhipment are avoided and short direct routes can sometimes be substituted for circuitous ground routes. Over difficult country, such as the forest regions of Canada, the mountainous districts of Colombia, the undeveloped spaces of Australia, the tropical areas of the Belgian Congo, and the snow and ice clad tracts of the Arctic, air transport has served to reduce journey times from weeks to days or from days to hours. Air transport shows to the greatest advantage where primitive forms of transport, such as canoe travel, are the alternative. In such circumstances it is possible to charge high mileage rates and at the same time to provide an economical means of transport.

The economic sphere of air transport is determined by its two main economic characteristics, *viz.* (1) great speed and (2) independence of the nature of the surface over which it operates. Its relation to other forms of transport is likewise determined by these two characteristics and by exploiting these advantages air transport is gradually making a place for itself among the various methods of communication.

Air transport shows to the greatest advantage (1) where long distances are involved, provided stages are available for refuelling, (2) where ground transport is hindered by geographical or topographical conditions, (3) where speed is essential, and (4) where sea crossings are involved.

The great speed of the aeroplane is clearly the main advantage where passenger traffic, mails, samples,

newspapers or perishables are concerned. In the case of bullion, credit documents, etc., the reduction in the time of transit enables interest charges to be reduced and in certain circumstances these savings may amount to a considerable sum.

The second characteristic of air transport also brings a number of advantages. The elimination of transhipment is a great convenience to passengers and for goods traffic it means less risk of damage or pilferage. Freight insurance premiums are lower and packing may be less elaborate. A more "individual" type of service can be rendered than is possible in the large scale handling of traffic by rail or sea, and this brings an incidental advantage in that quicker customs clearings can be effected.

Traffic suited to air transport is limited in amount. Whereas traffic handled by railways, ships or motor vehicles is measured in hundreds of tons that carried by air is at present to be measured in pounds. This does not mean that there is no scope for air transport, as on the contrary air services can find plenty of work to do in carrying valuable or special traffics or in providing transit facilities in districts where its economic advantages are at a maximum and those of its competitors at a minimum.

Many ill-informed views of the development and future possibilities of air transport are current and it is therefore very desirable that these should be viewed in their true perspective.

On the one hand it is necessary that the remarkable developments which have already taken place should be recognised, as also should the fact that air transport is coming to hold a definite place among the world's methods of communications.

On the other hand, excessive claims are often advanced and there are people who speak as if air transport is likely to supersede ground methods of communication. This, however, is a very unlikely contingency. It must first be clearly recognised that air transport is only suited at its present stage of development, and other than in exceptional circumstances, for the carriage of high grade traffic or

urgent consignments for which it is worth while to pay higher charges to obtain the faster service or the special advantages of air transport. At present European air services have to rely on government subsidies to meet part of their costs, and a considerable reduction in operating expenses will have to be effected before they can pay their way in competition with other types of transport. More intensive operation and the standardisation of machines, which at present rapidly become obsolescent, would do a great deal to reduce costs. During the past few years, certain air companies, notably Imperial Airways Ltd. and the K.L.M., have considerably reduced the margin between total costs and net receipts.

In the second place, bad weather, and especially fog, interfere seriously with air services. Great progress has, however, been made in the improvement of ground organisation, and this has done much to make flight possible under weather conditions which a few years ago would have prevented any flying at all. Notable contributions to the solution of the problem have been the adoption of wireless direction-finding and the evolution of the fog-penetrating neon beacon. There is no reason to suppose that further improvements will not be effected.

In the third place night flying, though commercially possible as exemplified in the U.S.A. and Germany and more recently on the London-Paris route, necessitates expensive ground equipment and this militates against the more general adoption of night services. It is also difficult to provide sleeping-berth accommodation for passengers owing to the limitations of space.

Finally, heavier-than-air machines have not proved suitable for long distance, non-stop, commercial routes, owing to the weight of petrol which would have to be carried.

Summary

From the foregoing analysis of the different types of transport, it is evident that there is no one form of transport which can be said to be superior for all purposes.

Each type has advantages which make it the best in certain circumstances, or for certain kinds of traffic. There is a differentiation in function between the various forms. Broadly considered, rail transport is supreme for heavy traffic and long distances. Road transport has the advantage on the short haul and for higher grade commodities. Air transport finds its main assets in speed and independence of ground conditions. Inland water transport and the coasting vessel are suitable for the carriage of low grade commodities in bulk where speed is not important.

The employment of the various types according to circumstances is an interesting example of what Marshall has called the "economic principle of substitution." That form of transport will be used which, in the particular circumstances, gives the service at the least cost, or which provides the most efficient service according to the needs of the passenger or the consignee. The same principle, also, is at work during a transitional period, when new modes of transport are being evolved or when increased efficiency or reduction of costs are being effected in the internal economy of any of the various types of transport. In a sense, it is possible to speak of the study of transport improvements and development as a study of the "principle of substitution."

But though, broadly speaking, it is easy to state circumstances in which any particular form of transport has the greatest net economic advantages, it is not so easy to mark off each form clearly and definitely from the others. The economic advantages of the various types of transport tend to overlap and there is a debatable margin of traffic, greater or less according to the circumstances, where keen competition is evident between the various forms.

Changing technique, the varying requirements of passengers or traders, the exploitation of new inventions or improvements in organisation are constantly causing variations in this debatable margin, sometimes small but sometimes great and far-reaching.

CHAPTER IV

COMPETITION BETWEEN ROAD AND RAIL TRANSPORT

FINANCIAL depression in the railway industry has occasioned much concern during recent years and in consequence a great deal of attention has been devoted to the problem. Two factors may be singled out as of especial importance in the present situation of the railways. These are (1) the competition of the new road transport and (2) the effects of trade depression among the heavy industries.

Since the relation of road and rail transport has been somewhat obscured during recent years by the wider economic influences of industrial depression, it is perhaps desirable that something should first be said of the effects of trade depression on railway revenues.

Despite strenuous efforts to improve their financial position by means of operating and other economies, and despite efforts to attract more traffic by means of better facilities and special fare reductions, the railways have not been able to redress the declining margin between receipts and expenditure. In 1927 the net revenues of the four groups fell short of the *Standard Revenue*, as defined in the Railways Act 1921, by about £7½ millions, and since that year the introduction of the new scales of charges, authorised by the Rates Tribunal from the Appointed Day (January 1st, 1928), has not enabled the railways to earn sufficient to show a reasonable profit. Much of the work involved in the revision of rates and fares by the Rates Tribunal has indeed been wasted labour and has gone for nothing, since road transport competition and economic depression in the heavy industries has forced a policy of reduced fares and "exceptional rates" on the railway companies.

The railways have been especially hard hit by depression in the coal, iron and steel trades, because the traffic of these industries, though carried at very low rates per ton-mile, is of great importance to the railways, since it passes in quantity and can be cheaply handled. The importance of coal traffic is indicated by the fact that even in 1927, it constituted 50.25 per cent. of the total freight traffic ton-miles carried by railways. Since the War, the decline in coal traffic has been considerable, though in 1923 the occupation of the Ruhr caused a temporary stimulus to coal exports and its effects were carried on into 1924. In 1913, coal, coke and patent fuel traffic aggregated some 225,601,000 ton-miles, but in 1927 it had fallen to 199,307,000 ton-miles.

TABLE VIII

Coal, Coke and Patent Fuel Traffic on
British Railways (excluding free hauled).

1913	225,601,000	ton-miles
1922	200,102,000	"
1923	222,234,000	"
1924	209,160,000	"
1925	193,661,000	"
1926	114,095,000	"
1927	199,307,000	"

NOTE.—Increase in 1923 due to occupation of the Ruhr.
Decrease in 1926 due to General Strike.

TABLE IX

Receipts from coal traffic.
(L.M.S., L.N.E., G.W. and S.
Railways.)

Year	£ Million
1923	39.1
1924	36.8
1925	34.9
1926	23.5
1927	36.7

NOTE.—Traffic for 1926 and 1927 included imported coal.

Trade depression has also been responsible for a considerable drop in railway revenue from workmen's tickets.

TABLE X

Number of Workmen's Tickets Issued.				
1923	1924	1925	1926	1927
310,301,402	310,280,715	308,584,456	260,160,693	286,980,183

Road competition is not responsible for the loss of revenue from coal or workmen's tickets, because road transport is not suited to the carriage of coal, and motor bus concerns do not usually issue workmen's tickets, as there is no statutory obligation on them to do so, such as is imposed on railways and tramways.

A revival in the heavy industries would do a great deal to improve railway traffics but it is not yet possible to say what proportion, if any, of this traffic will be regained as the result of improved economic and industrial conditions. The economic factors are very complicated and it is impossible to guess what technical changes are likely to be effected in the heavy industries in the near future. Some revival is to be expected but it is difficult to see how the pre-war export of coal can be regained. The demand for British coal has been lessened by the expansion of foreign coalfields, the development of hydro-electric power, and the tendency to substitute oil fuel for coal on ocean-going ships. On the other hand, there are possibilities in the use of pulverised coal fuels, while technical improvements in the treatment of coal (*e.g.*, low temperature carbonisation or the hydrogen process) may revolutionise the coal industry. If the new works were established at the pit head coal traffic would not be increased, but the railways should gain traffic in oil and bye-products. Some stimulus, it would seem, has already been given to coal traffic by the de-rating scheme, which has enabled lower rates to be given for coal and certain other traffic. By this Act, local rates on freight transport hereditaments have been

reduced by 75 per cent. on condition that the savings effected were passed on directly as reductions in freight rates on export and blast furnace coal, colliery materials and agricultural produce.

Railway traffic losses and road competition.—During this period of trade depression in the heavy industries, the railways have had to face the growing competition of road transport. The increasing number of private cars has meant the loss of passenger traffic, especially that of season ticket holders. On short distance journeys, and especially in districts served by branch lines, motor buses have proved serious competitors, while more recently in Britain, as in the United States, this competition has been carried into long distance passenger transport. Motor vans and lorries have abstracted high-grade traffic, placed in the higher and more remunerative categories of the railway classification, as this is naturally most susceptible to competition. The increasing popularity of private fleets of motor vehicles among traders and manufacturers—doubly attractive by reason of the publicity value of smart motor vehicles—has led to a further loss of traffic from the railways.

The railway companies allege that road transport competition has become a serious matter during the last few years. Sir Ralph Wedgwood has stated in evidence before a Select Parliamentary Committee that traffic was falling off on branch lines in agricultural and thinly populated areas and that some of these branches were at the point of becoming unremunerative. Since then, the Southwold Railway—an independent 9 mile system—and the Nidd Valley Light Railway have been closed down, as their passenger traffic has been killed by motor bus competition. The L.M.S.R. has also decided to close its 15 mile Garstang to Knott End branch for passenger traffic, and similar action has been taken by the L.N.E.R. on their Kirksmeaton-Wath branch, and by the Severn and Wye Joint Railway. Branch lines and light railways are naturally very susceptible to motor bus competition,

since it is not possible to provide frequent services by rail where traffic is light and since also the distances traversed are generally short. Light railways are also hindered in their competition with motor buses by reason of various restrictions, such as the limitation of maximum speed imposed by the Ministry of Transport.

Though statistics of traffic lost by the railways to their road transport competitors are not available, common observation and information gained from traders and others would indicate that the loss is considerable. General merchandise carried by railways has declined by something over 7,000,000 tons between 1913 and 1927.

TABLE XI

General Merchandise traffic carried by British Railways.

	Tons		Tons
1913	67,755,000	1925	59,739,000
1922	52,844,000	1926	53,439,000
1923	58,979,000	1927	60,567,000
1924	60,943,000		

Between 1923 and 1927 passenger traffic (ordinary fares) showed a decline of some 24 million tickets. Allowing for the increased population and for the increase in the travel habit, which seems to be a cumulative characteristic of modern civilisation, it would seem that the railways have been seriously hit by road competition. Season tickets have shown a reduction from 894,000 in 1923 to 794,000 in 1927; the decline being very marked in the case of First Class Seasons, and of this the undoubted cause is the increase in the number of private cars.

TABLE XII

Passenger traffic on British railways. (Ordinary tickets.)					
Year	1st Class tickets	2nd Class tickets	3rd Class tickets	Workmen's	Total
1913	25,441,787	10,256,647	907,882,780	255,684,307	1,199,256,521
1923	21,470,300	4,055,268	899,739,450	310,301,402	1,235,566,420
1924	21,448,318	2,928,810	901,552,184	310,280,715	1,236,210,021
1925	20,773,787	2,773,097	900,449,574	308,584,456	1,232,580,911
1926	18,169,209	2,433,805	788,220,514	260,160,693	1,068,984,22
1927	18,934,688	2,475,497	866,348,789	268,980,183	1,174,739,151

TABLE XIII

Season Tickets. (Equivalent Number of Annual Tickets.)				
Year	1st Class	2nd Class	3rd Class	Total
1913	104,618	77,149	402,442	584,209
1923	132,926	73,825	686,917	893,668
1924	123,953	49,994	677,127	851,074
1925	117,934	48,748	684,547	851,229
1926	105,934	45,357	637,343	788,159
1927	99,951	44,433	649,407	793,791

NOTE.—Figures for 1926 were affected by the General Strike.

To retain their traffic the railways have been forced to grant numerous special fare reductions and there has in consequence been a steady increase in the proportion of such tickets. Despite the reduction in the number of passengers carried, there has been no curtailment in services, and on the contrary passenger train miles operated have been increased by nearly 9 million as compared with 1913.

TABLE XIV

Passenger Journeys. (Percentage of Total.)			
Year	Full Fares	Reduced Fares	Workmen's Fares
1925	42.60	30.42	26.98
1926	40.90	32.92	26.18
1927	34.24	39.52	26.24

Especially disquieting to the railways must be the fact that motor buses can be operated successfully at fares of 1d. per mile (as compared with the ordinary 3rd class fare of 1½d. by rail), and they can afford, moreover, to give appreciable reductions for return tickets. Long distance, limited stop buses are now carrying competition further afield and many such services have been put into operation during the last few years, *e.g.*, London-Edinburgh, London-Newcastle, Manchester-Glasgow and Edinburgh-Glasgow. In 1928 a number of night services were introduced in which sleeping berth accommodation was provided at fares lower than the ordinary rail fare. The inauguration of long distance bus routes has been one of the most striking developments in road transport during recent years. As compared with railway trains the journey time involved is naturally much greater and the comfort is less, but there is the great attraction of the cheaper fares. To meet this competition, the railways are being forced to increase their reduced-fare tickets. Curiously enough the average receipt per mile obtained by the railways, including all full fare and reduced fare tickets, approximates very closely to what must be the average receipt of motor buses, allowing for reductions on return tickets.

TABLE XV

Average receipts per mile on railways. (4 groups only.)

Year	Average receipt
1923	— 0·95d.
1924	— 0·92d.
1925	— 0·89d.
1927	— 0·86d.

Britain is now covered with a close network of bus services, both short and long distance. In many areas, strong, well-organised concerns have grown up as the result of the combination or absorption of smaller undertakings.

There has been a drift towards larger bus concerns, though in a few cities competition is still severe. The big bus companies, with their large capital resources and widespread systems, are now very strongly entrenched. They have obtained a monopoly of road transport services in their districts and are able to reap the benefits of large scale working.

So far, however, road and rail competition has been most severe for the shorter distances. It is significant that the average distance travelled by rail passengers has increased from 13.96 miles in 1923 to 15.22 miles in 1927. In evidence before the Select Parliamentary Committee on the Railway (Road Transport) Bill, a very interesting analysis was presented, which compared passenger receipts (other than season and workmen's tickets) in 1923 with those of 1927. The figures refer to tickets issued between all pairs of stations on the L.M.S. railway system, where receipts at the originating stations were £100 or more during the month of July 1923.

TABLE XVI

Passenger Receipts (L.M.S.R.) arranged in mileage zones.

Mileage zone	Receipts		Increase + or decrease—	
	1923	1927	£	per cent.
1 to 10	... 886,000	£ 649,000	—237,000	—27
Over 10 up to 20	... 1,253,000	962,000	—291,000	—23
,, 20 „ 50	... 2,690,000	2,450,000	—240,000	—9
Total up to 50	... 4,829,000	4,061,000	—768,000	—16
Over 50 up to 100	... 1,609,000	1,640,000	+ 31,000	+ 2
,, 100 „ 200	... 2,060,000	2,147,000	+ 87,000	+ 4
,, 200 „ 2,278,000	2,293,000	+ 15,000	+ 1
Total over 50	... 5,947,000	6,080,000	+ 133,000	+ 2

The lessened receipts for short distance traffic as compared with the greater revenue from passengers travelling

over 50 miles indicates that short-distance road transport competition is the main cause of reduced passenger earnings on railways. If stations with smaller bookings than £100 in July 1923 were included, it is probable that the figures would be even more significant.

In 1928, Mr. G. Ponsonby, M.A., of the *Railway Research Service*, and Mr. S. R. Ransome, of the L.N.E.R., made a valuable survey of a typical area of the Eastern Counties, where road and rail services radiate from a city of 120,000 inhabitants. The investigators concluded that though the buses had developed a considerable amount of new traffic, they had also taken a great deal of traffic from the railway, especially within a 10-mile radius. Within this 10-mile limit the average decline in railway traffic was nearly 30 per cent., while from two stations a mile or so distant from the villages which they served the falling off in traffic was 41 per cent. and 45 per cent. respectively. The popularity of the motor bus, it appeared, was due to the shorter door-to-door services, the avoidance of circuitous rail routes, the provision of late night and Sunday services, and the saving of the inconvenience occasioned by a walk to the station. The construction of new houses it appeared was following the bus routes rather than clustering around the stations.

While merchandise and passenger traffic has been very susceptible to road competition, parcels and miscellaneous traffic carried by passenger train or equivalent services have proved much less vulnerable to competition. Such traffic also has not been affected to any great extent by the depression in the heavy industries.

Parcels, newspaper and fish traffic have shown a continuous increase (except during the abnormal strike year) from 1923 to 1927. It would seem that where the railways can give a service similar to, or better than road services, traffic can be increased. Fish traffic provides an excellent example of traffic retained by superior rail services. Fish is often carried for long distances as from Aberdeen or Mallaig to London and for many years the railways have provided special facilities for such traffic.

Milk traffic, on the other hand, has decreased, though railway rates for this traffic are based on the zone system which favours longer distances, but the decrease was to be expected in view of the growth of road facilities.

TABLE XVII

Parcels and Miscellaneous Traffic by Passenger Train or equivalent facilities. (Gross Receipts.)

	1923	1924	1925	1926	1927
Parcels ...	£ 6,582,664	£ 6,616,679	£ 6,781,752	£ 6,627,507	£ 7,033,402
Newspapers ...	1,400,649	1,544,893	1,693,055	1,679,835	1,870,503
Horses ...	414,578	406,496	425,701	385,379	399,929
Milk ...	1,678,233	1,679,526	1,663,564	1,507,638	1,481,320
Meat ...	206,521	214,774	226,424	178,118	149,834
Fish ...	1,492,609	1,496,147	1,519,736	1,468,392	1,524,324
Fruit and Vegetables	346,242	338,353	299,689	311,300	289,390
Other Perishables ...	172,453	163,366	147,691	162,151	not available

These figures give weight to the suggestion of Mr. R. Bell, C.B.E. (Assistant General Manager L.N.E.R.), that the railways will be forced in the near future to operate more braked freight trains, shorter than the ordinary goods train, but travelling at greater speed.

It can of course be contended that all traffic carried on motor vehicles is not traffic necessarily lost to the railways. Some of it undoubtedly is new traffic created by the new facilities. Many persons for instance travel by motor coaches who could not be persuaded to undertake a similar trip by rail. Then again some traffic is that which has been taken from horse transport, e.g., local carriers or delivery rounds. Further, road transport may bring traffic to the railways as well as abstract traffic. The development of mechanical road transport has opened up remote districts; it has had psychological reactions and has increased the travel habit, while the new industry has stimulated traffic in road metal, asphalt, sand, tar, petrol, oil and motor vehicle components and materials. In 1920 some 7 million tons of road material were conveyed

by rail, and by 1925 this had increased to $12\frac{1}{2}$ million tons. Between 1921 and 1925 the railway revenues from the carriage of dangerous oils increased from just under 1 million pounds to over 2 million pounds.

On balance, however, the railways have lost traffic to the roads. Since the war, an extraordinarily extensive system of road transport has grown up in all parts of the country. The mere statistical statement of the remarkable growth in the number of motor vehicles is in itself impressive and it would indeed be surprising if the railways had not felt the effects of this competition. In 1919 there were only about $\frac{1}{4}$ million motor vehicles on the roads. In 1920 there were half a million, in 1923 1 million, and in 1925 $1\frac{1}{2}$ million, while in 1928 the number had increased to over 2 millions.

Road and rail competition in the United States.—Road transport competition with the railways is now general throughout the world. In the U.S.A., Canada, Ireland, Holland, Germany, France, South Africa, New Zealand and Australia, complaints of road competition are frequent, and the various railway administrations are seriously concerned by the loss of traffic. In Britain and the United States, it is true, the problem is especially acute, though for different reasons. In our own country, competition is severe because of the excellence of both our roads and our railways and because of the prevalence of the short haul. In America, competition has been stimulated by the low first cost of motor vehicles ; by the less onerous motor taxation ; by the higher standard of living, and by certain predisposing causes favourable to motor transport, such as the larger areas served by each railway station ; the bigger wagons employed ; the higher rates for "less-than-carload" (L.C.L.) traffic ; the less frequent service of trains provided in sparsely populated parts, and the higher speeds possible on the motor highways of the New World as compared with those permissible on British roads.

In the United States, motor competition has been most severe in the case of passenger traffic. Private cars and

motor buses have proved severe competitors with the American railroads which are suffering from this competition to an even greater extent than British railways. In 1928, passenger traffic on the American railways declined to a record low figure for the past twenty years. Revenues from passenger traffic for the first eight months of 1928 were lower than the corresponding period in 1927 by £10,400,000. As compared with the record year 1920, passengers earnings in 1927 were 32.8 per cent. less and the number of passenger-miles operated decreased by 28.2 per cent. In 1920, some 1,234 million passengers were carried, but in 1926, the corresponding figure was only 860 millions. During this period, revenues from sleeping and parlour car traffic actually increased though other passenger traffic receipts declined, and this clearly points to motor competition as the cause of the decrease.

During the past few years, there has been a steady growth in long distance passenger transport by motor bus. In the West and Middle-West, where there was a demand for better transport facilities, a number of important firms grew up out of numerous small competing concerns. Whereas railways had their origin in the Eastern States and were gradually pushed Westward, motor bus development has been in the opposite direction from West to East.¹ These Western firms now provide a network of services linking rural areas not only with the nearest town but with practically every city in the States.

The great distances over which regular services are now maintained is extraordinary. One concern—the American Motor Transportation Company of Oakland, California, which was formed as the result of amalgamations in 1928, maintains a twice daily service over the 3,314 miles between Los Angeles and New York.

On the various long distance routes, average scheduled speeds of over 25 miles per hour are maintained. Night travel has proved popular and many of the buses engaged on such routes are now fitted with adjustable air-cushioned

¹ See article in "Modern Transport," September 29th, 1928, p. 3.

seats which can be inclined at an angle of 45 degrees and which are sufficiently comfortable to sleep in.

American experience shows that the railways must not neglect the possibilities of motor bus competition on long distance routes, though so far competition in this country has been mainly felt on the short haul. The success of the American long distance motor bus routes would seem to be due to the attraction of the lower fare. Between Los Angeles and New York for instance, a saving of \$34 is effected. Operating costs have been found to be lower on the long distance routes than on short journeys since starting and stopping are less frequent and a smaller proportion of the mileage is through congested town streets. Such factors, it will be noted, also operate in Britain though the speeds of 40 miles per hour or more, possible on some of the American Motor Highways, cannot be approached in this country. Another important factor in the popularity of the motor bus in America, as in this country, is the convenience of the stopping places. This naturally is of most importance on short hauls, but it is more significant in the U.S.A. than in Britain, since in the West and the Middle-West, railway stations are frequently at considerable distances from each other.

While road competition for passenger traffic has been severe in America, railway freight traffic has been much less liable to loss. Indeed, there has been a progressive increase in the volume of freight traffic carried by the railroads, and it is now generally accepted in the U.S.A. that motor lorries or trucks will not compete so seriously with the railways as was thought at one time. Motor transport is confined for the most part to short distance traffic generally under 30 miles.¹ The average railway freight haul in America is long, and thus road competition is not serious. In Britain, on the other hand, average hauls are comparatively short and traders demand a very high quality of service.

¹ See Tables IV and V, p. 33.

TABLE XVIII

Average length of Haul on British Railways.

	L.M.S.R.		L.N.E.R.		G.W.R.		S.R.	
	1923	1927	1923	1927	1923	1927	1923	1927
	Miles	Miles	Miles	Miles	Miles	Miles	Miles	Miles
General Merchandise (including live-stock) ...	63.01	67.67	60.86	61.65	62.84	63.93	49.63	48.00
Coal, coke and patent fuel ...	38.20	40.64	34.21	34.68	32.99	33.86	35.41	37.29
Other minerals	47.66	47.70	36.61	37.92	44.99	45.33	34.50	36.25
All Traffic ...	45.01	48.08	39.34	40.55	39.56	41.15	39.61	40.42

The economic effects of loss of traffic by railways.—To the railways, loss of traffic is a serious matter, because the industry is one in which fixed or overhead costs bear a very high proportion to the total costs of transport. Whereas many other industries, to some extent, can accommodate themselves to a loss of business—though no doubt the process would be a painful one—a railway must maintain a large minimum equipment whatever the amount of the traffic. If traffic declines, the average cost per unit of traffic will increase. The argument would apply in the same way if the railways were to divert traffic to their own road motors and herein lies a danger in the unwise use of road transport by the railways.

It is true that a railway company could go on working without paying dividends on its stock, and there is a case on record of a company which carried on despite the non-payment of its debenture charges, though to make sure of their assets the creditors affixed their names to the locomotives. Such a policy might be better than closing down and suffering a total loss, but its effects would be to dry up the sources of new capital. If railways are to compete successfully with road transport, they must have money available, either from reserves or from new capital issues, so that improvements may be effected. It is

unfortunately the case that many operating economies involve the spending of more money in the first place and even minor improvements such as hump marshalling yards, automatic rail brakes, new signalling methods or new rolling stock, such as glass-lined milk tankers, cannot be introduced without spending money. Moreover, improvements frequently involve a wait of several years before the capital fructifies.

Under the provisions of the Railways Act 1921, rates and fares are to be adjusted from time to time so that, if possible, the Standard Revenue as defined in that Act will be earned by each of the four Groups. But if charges are increased to meet declining revenues, more traffic would probably be diverted to the roads and that which remained would have to bear a still heavier burden. This would not be to the national interest, as it would in effect be a tax on the raw materials of industry. So many difficulties and anomalies might result in present circumstances from an upward revision of railway charges that this provision of the Act would seem to be unworkable. In any case it is probable that the railways would not gain an increased revenue from higher fares and rates.

Another difficulty confronting British railways has been the inelasticity of their wages bill. Staffs redundant on the amalgamations cannot be dismissed without compensation and wages are 140 per cent. higher than they were in 1913. Actual earnings are even greater owing to more favourable conditions, *e.g.*, overtime, standardisation of grades, etc. In April 1929, the railway companies agreed to adopt somewhat similar conditions for their road transport employees and in so far as this reacts on the wage rates and conditions of service of the independent road transport undertakings, it should serve to lessen competition where this has been due to the lower wage costs of road transport.

In 1913, the Railway Companies' wages bills accounted for 37·0 per cent. of the total receipts, but in 1924, the proportion had risen to 56 per cent. No doubt, before the war, earnings were somewhat too low, especially as many

railwaymen are involved in great responsibility, but under present conditions the increased wage bill, which of course is considerably above the increase in the cost of living, is a heavy burden. The voluntary reduction of $2\frac{1}{2}$ per cent. on all wages, salaries and Directors' fees was a recognition of this burden and of the then serious plight of railway finance. The reduction has proved a great help to the companies in their efforts to stabilise their finances, though even more valuable is the spirit which lies behind it.

Is road competition fair competition?—Competition between road and rail transport has aroused a great deal of controversy and has been the cause of much mutual recrimination between the rival parties. The railways have contended that this competition is unfair because (1) the capital costs of road construction have been borne almost entirely by the community, whereas the railways have had to provide and build their own permanent way and to purchase the necessary lands and easements, and (2) they have had to contribute as ratepayers towards the upkeep of roads which are used by their competitors, but which, until 1928, the railways could not utilise for direct road services. They have argued that road vehicles, especially heavy commercial lorries, did not pay the full cost of the wear and tear they caused to the roads. During the past year or two the position has been somewhat modified as motor vehicle taxes have been increased and an additional impost of 4d. per gallon on petrol has been levied. The petrol tax, it is said, in effect increased the burden of taxation on motor transport by about 50 per cent. In 1928, the railway companies obtained the road transport powers which they had been seeking, while in 1929 they obtained a remission of the Passenger Duty on condition that they spent an equivalent amount on improvements. They should also gain something from an increase of traffic stimulated by the de-rating scheme, which is being subsidised by the petrol tax. They still complain, however, that they are in a less favourable position than their road rivals, since they have to meet the interest charges on the cost of their permanent way and because they are restricted

in several ways by definite legal obligations. They point out that they are *common carriers* and are thereby forced to accept almost any kind of traffic which may be offered. They are also bound by the law of "*undue preference*," which of necessity renders it difficult to adjust charges and facilities with rapidity to meet special cases as they arise, since the companies must not give any one trader an undue advantage over another. Road hauliers, on the other hand, generally work to contract and so are not bound by the law of common carriage, nor are they restricted by questions of preference. They are in a position to choose their traffic: taking the most remunerative and rejecting the less valuable. They generally work without any "*classification*," whereas the railways have developed an intricate classification, sanctioned by statute and based in the main on the value of the commodity carried.

In the U.S.A. certain of the States have attempted to regulate road hauliers by extending to them certain of the regulations applicable to American railroads. Thus in California, the publication of road transport rates is enforced, and any undue preference is prohibited. In Washington, the Department of Public Works has undertaken the preparation of a classification for motor transport and there is a growing body of opinion in the States that some form of classification must be evolved.

"A classification for motor freight is of such fundamental importance in rate making that no real progress can be made in fixing reasonable rates for highway transportation until a comprehensive system of classification practice is developed."¹

In this country, it is sometimes argued that road transport should be regulated by some statutory authority in regard to charges, classifications and the terms and conditions of service. Against this contention it can be urged that it would be difficult to frame satisfactory legal restrictions of this nature and too stringent regulations would tend to strangle the young industry. If it

¹ *Lloyd Wilson*, "Motor Traffic Management," Ch. IV, p. 44.

were desired to equalise conditions between road and rail transport as regards statutory restrictions, it would probably be better to lighten the burden on the railways, now that the monopoly conditions which prevailed when the regulations were imposed, have largely disappeared. Among the burdens from which the railways are endeavouring to obtain redress is their liability to maintain road bridges and the approaches thereto, involving a total mileage of 775 for which no contribution is received from the Road Fund.

The railways also complain that signalling on roads is provided out of public funds and that motor vehicles can use the streets as their stations without charge.¹ The provision of stances and parking places has become an acute problem in many towns. In Newcastle-upon-Tyne the difficulties have been so considerable that steps have been taken by the municipality to construct a motor bus station, which will be available to all owners on payment of a small fee, though it would appear that the station has not proved very popular as it has been boycotted by motor bus owners. The assertion that road transport competition is unfair is vigorously controverted by the road transport interests. In their view the railways have lost traffic by failure to move with the times. The railways should reduce their charges and improve their services. The stimulus of competition, they assert, has led to a great improvement in railway services.

As regards road maintenance, they assert that the receipts from motor taxation are ample to meet the full cost of maintenance.²

In concluding this account of road and rail competition, it is necessary to point out that there are now signs that road and rail transport are finding their natural economic equilibrium. Important economies in expenditure have

¹ A number of motor coach and bus stations are now being built, *e.g.*, at Kennington Oval and Euston, to provide terminal facilities for passengers.

² For a statement from the point of view of the road transport industry see *C. T. Brunner*, "The Problem of Motor Transport," and "Road Versus Rail."

been effected by the railways which in 1928 amounted to 6½ million pounds ; facilities, equipment and services have been greatly improved, while the de-rating scheme and the remission of the Passenger Duty will no doubt also improve the position from the railway point of view. The road powers obtained in 1928 should enable the railways to obtain some of the profits which are to be obtained from the provision of road services and at the same time these services, since they can be co-ordinated with rail facilities, should serve to prevent the diversion of traffic. Sir Ralph Wedgwood, in April 1929, stated that " generally speaking the railway companies are holding their own with road competition in goods traffic : and if they are losing in some directions, they are gaining as much or more, in others." He pointed out that in 1928 passenger traffic showed a decline of 2½ per cent. in receipts, which when compared with the heavy falling off in previous years indicates that the railways are achieving success in preventing a further drift to the roads. The prospects for the railways are thus brighter than they were a few years ago, though of course road competition is still severe, and in certain directions increased competition may yet have to be faced. The encroachments of road transport have slowed down and this indicates that some degree of stability in the relationship of road and rail transport may be obtained in the near future. This should make more easy the attainment of some form of co-ordination between the two forms of transport.

CHAPTER V

THE ECONOMIC BASIS OF CO-ORDINATION

As a possible solution of the transport problem there has been an increasing tendency to search for some compromise whereby the various methods might be co-ordinated to their mutual advantage and to the benefit of the public. Such co-ordination implies that each form of transport would be used in the economic conjuncture best suited to its characteristics.

It is clear that competition has not furnished a solution to the transport problem and it is evident that the best use is not being made of the available facilities. Unnecessary overlapping is wasteful, as it means that two sets of capital are seeking remuneration where one should suffice. Rival enterprise may starve each other of traffic and competing vehicles may be running half-empty. Costs may be swollen by duplicated administrations, competitive advertisements, the provision of surplus vehicles and in many other ways. The scale of operations of the competitive firms may be smaller than the optimum economic size of concern in the given conditions, with the result that the full economies of large scale enterprises are not obtained. Where competition is severe, the leaner routes will probably be neglected while the best paying routes will be over-crowded with vehicles. On the roads, severe competition tends to increase traffic congestion and encourages such evils as racing or "cutting in" to the neglect of "safety-first" precautions. Services may be less reliable and the maintenance of vehicles may not be sufficiently attended to. The narrow margin of profit, obtained in such circumstances, if indeed there is not a direct loss, is likely to prevent the establishment of the transport undertakings on a sound commercial basis, and eventually this is likely

to react unfavourably on the community. Sometimes severe competition is followed by monopoly, though later on competition may break out again. Competition it is true has certain important advantages, but it is clear that the continuance of unrestricted competition, especially between road and rail transport, is not in the best interests of the public, and sooner or later a solution must be found. What is required is some *via media* between undue competition and unrestricted monopoly.

If co-operation could be substituted for competition, road and rail transport could be used to supplement each other and arrangements could be made whereby each system would be employed under the most suitable conditions. The advantages of co-ordination are obvious, since unnecessary duplication of services would be eliminated ; the aim being to secure the most efficient transport possible, utilising the least number of vehicles, trains or machines which would serve the purpose. Traffic better suited to one method of transport would be handed over to, or reserved for, that form, and thus the means of transport would be employed in each case which could be operated at the least cost in proportion to the particular service rendered. Co-ordination it can be urged would provide for the " rationalisation " (in the best sense of the term) of the transport industries and it is thus in accord with current tendencies in other industries. Co-ordination implies (1) the elimination of wasteful competition as between various independent enterprises engaged in providing a particular type of transport, *e.g.*, competition of motor bus company with motor bus company or of railway with railway, and (2) the prevention of unnecessary and wasteful competition as between different forms of transport, *e.g.*, between motor buses and tramways or between road transport and railways. The word co-ordination has been applied indiscriminately to all policies which have either or both of these aims as their object.

The fact that the various types of transport have each certain advantages and limitations for the carriage of particular types of traffic or for use in certain circumstances

provides the economic basis of co-ordination. There is a differentiation in function between each of the principal forms. If there was no such differentiation there would be no case for co-ordination on economic grounds, because if one type of transport was superior for all purposes, the sooner it was generally adopted the better. Co-ordination in such circumstances could only be urged as a temporary expedient to ease the transition of labour and capital from one form to the other.

Co-ordination in the past.—Some degree of co-ordination has always been practised, if only because two or more forms of transport are generally required for the carriage of commodities from their place of origin to their ultimate destination. But in the past, such co-ordination has been for the most part haphazard and casual. Before the war the most extensive system of co-ordination was that provided by the railways, through their collection and delivery services. The cartage areas, however, were somewhat limited and horse vehicles were almost invariably employed. In England, contrary to general practice abroad, the companies both owned and operated their own horse vehicles. In Scotland, the work was until recently carried out by subsidiary companies, of which "*Messrs. J. and P. Cameron*" was a well known example.

From about 1850 up to 1914, the problem of co-ordination was comparatively easy of solution since there was a more or less clear demarcation between the various types of inland transport. This was a relatively static period in transport evolution and so each form of transport fell naturally into its own sphere and a species of unconscious co-ordination resulted. Perfect equilibrium was not achieved, since there was a certain degree of wasteful competition between rival railway companies and between electric tramways and local railways.

Though co-ordination is not difficult to effect under static conditions, it is a far more difficult problem where conditions are dynamic. In transitional periods, competition is keen and the exact economic sphere of each form of transport is changing. The older concerns may

be faced with the loss of their capital and unemployment may threaten their workers if the new methods result in the supersession of the old. Thus the coach proprietors of the second quarter of the nineteenth century viewed the coming of the new methods as the "calamity of the railways." In the same period, the canal companies became demoralised by the advent of competition and instead of putting their house in order, were content to suffer an almost complete eclipse after 1850. The more astute had previously sold their undertakings at fancy prices to the new railway companies as the price of acquiescence in the promotion of Railway Bills in Parliament.

Practical difficulties.—Though everyone would agree that unnecessary overlapping and wasteful competition is undesirable and costly, the difficulty is to find a scheme of co-ordination which would secure all the advantages of co-operation but which would neither check the legitimate development of new forms of transport, nor injure the interests of the public. The problem is complicated by the fact that it is not easy to determine the *exact* economic sphere of the new types of transport as compared with the old. Transport development at the present time is very marked and from year to year improvements are being effected in every form both new and old. Another factor is that of variations in the relative price of different kinds of fuel.

Though complementary, the various forms of transport are also competitive. Their spheres overlap and each seeks to obtain a large part of the debatable margin of traffic for itself, since fixed capital, previously sunk in the enterprise, has to be remunerated. In certain localities, there is insufficient non-competitive traffic available for the adequate remuneration of the large capital sunk in the various enterprises, and therefore it is at the debatable margin that the fiercest competition prevails. Loss of traffic is especially important where overhead or fixed capital costs are large, because small-scale working tends to increase costs per unit of traffic. In certain enterprises,

moreover, the capital is incapable of transference. Thus tramways and railways require a large fixed capital which is almost entirely incapable of transference, while mechanical road transport requires little fixed capital and the greater part of the capital is very mobile.

The multiplicity of road transport undertakings and the ease with which new enterprises can be started considerably increases the difficulties of inaugurating a system of co-ordination. Where only railways and large motor transport firms are concerned, it is easier to introduce co-ordinated working, but co-ordination is much more difficult to achieve where road transport is in the hands of numerous small owners.

Another difficulty in all discussions on co-ordination is that the word frequently signifies different things to different persons and it may mean much or little according to the interpretation given to it. The question therefore is in need of a thorough investigation and this fact has been recognised in the appointment of the Royal Commission on Transport.

Because of the many practical difficulties in evolving a logical system of co-ordination, it is only in Germany that a definite attempt has been made to co-ordinate rail, road, air and inland water transport. In Germany, however, the problem has not been so difficult as in Great Britain or the U.S.A., because road transport is not so highly developed.¹ Recently greater progress has been made in the extension of road services throughout Germany and it would seem that this development has introduced complications into the problem of co-ordination.

Types of co-ordination.—Co-ordination of the various means of transport might be achieved in a variety of ways,

¹ To account for the slow development of mechanical road transport in Germany several reasons may be advanced. Owing to the serious shortage of rubber, little progress was made during the War by motor transport in Germany, as iron-tyred lorries were not very suitable for military needs. Greater reliance, in consequence, was placed upon light railways. So great was the shortage of rubber that private motor cars became practically unknown, and cyclists had to be content with curious iron tyres, mounted on a number of steel springs. For some years after Peace was declared, the development of motor transport was delayed by the disturbed state of the country.

though a broad division may be made into three categories.

Firstly co-ordination might take the form of *voluntary co-operation* between the various transport undertakings (including municipalities providing public transport services), each maintaining its separate identity. In this type of co-ordination the various transport concerns would be more or less equal partners.

Secondly co-ordination might be achieved through the provision of road, air or canal services by railway companies or through the financial control of such concerns by railways. In this form of co-ordination, road transport would be definitely subsidiary or auxilliary to the railways.

Thirdly co-ordination might be statutory or quasi-legal in character. Some form of pooling of resources, or combination would be encouraged and in the last resort, made compulsory. A certain degree of common management might be introduced and some controlling body would be set up to safeguard the interests of the public. For such control, there is the precedent in the control exercised by the State over railways in the past, when after many years of hesitation, Parliament was at last forced to recognise the inevitability of a railway monopoly. The State eventually came to recognise that monopoly eliminated the wastes and abuses of competition but such recognition was tempered by strict regulation in the public interest.¹

Whatever be the precise type of co-ordination adopted, it would be necessary to treat each natural traffic area as one unit; feeder and development services being operated in conjunction with the main traffic routes of the region. A regular system for effecting transference between road, rail and other types of transport could be introduced, and for this purpose, it has been suggested by Mr. D. R. Lamb (Editor of "Modern Transport"), that existing railway

¹ This is seen clearly in the principles underlying the Railways Act, 1921, though in actual fact a considerable amount of competition survived the grouping of the railways. By a curious irony at the time when the Act was passed the day of railway monopoly had already gone, though those responsible for the 1921 Act did not appreciate the significance of the recent development of road transport.

stations and depots might be used so that the one organisation would suffice to act for the reception and distribution of traffic.¹ In this manner much unnecessary capital expenditure would be avoided. All consignments would of course bear their fair share of the terminal expenses and if stations or depots were owned by the railways, the latter would be entitled to a fee for their services.

It is to be observed that there is a necessary distinction between local co-ordination and nation-wide co-ordination. The former would be confined to a definite local administrative area or to a clearly defined traffic area, *e.g.*, Greater London, while the latter would extend over the length and breadth of the country. As regards local areas, it is seldom that administrative areas coincide with a natural traffic area and it would, therefore, be better to organise local co-ordination on a regional traffic basis. If co-ordination were effected within each regional traffic area, that would solve the problem as regards local traffic but not as regards long distance traffic and inter-regional transport, since railways and long-distance bus services transcend regional boundaries. To co-ordinate inter-regional traffic, some form of joint committee for contiguous authorities would have to be established, and some supervisory authority would have to be set up to regulate long distance transport on the main trunk routes.

There are some who suggest that the nationalisation of transport would solve the problem of co-ordination, but it is difficult to see how this would be the case. Presumably municipal passenger transport systems (at least) would not be absorbed by the nationalised railways and thus the problem of co-ordination would remain to be solved. It would also be necessary to regulate the relations of rail, road, air and canal transport, if separate administrations were set up for each of these industries. It might also be the case that other nationalised industries, *e.g.*, the Post Office, would want to operate their own transport.²

¹ Paper read before the Institute of Transport Congress, May, 1925.

² In Germany, at the present time, the Post Office operates numerous road services which carry passengers as well as mails, in direct competition with the State Railway Company.

The three different types of co-ordination lend themselves in varying degrees to the solution of the different problems involved. Obviously, mutual co-operation is most suitable to local traffic agreements, whereas railway ownership or control would be especially suitable for co-ordinating road and rail transport as a whole. Quasi-legal or statutory co-ordination is most suitable to regional areas, though difficulties might arise in regard to inter-regional traffic. On the other hand, if a supreme traffic-controlling body were set up, long distance traffic could be regulated, but such an authority could not attend to local details. Some detailed examination of the three main types of co-ordination is, therefore, necessary to determine their nature and relative advantages.

Voluntary co-operation.—Voluntary co-ordination has the advantage that the complementary characteristics of road and rail transport are stressed rather than the competitive aspect. Mutual facilities could be provided, such as the use of each other's booking offices for through journeys, the use of stations, dovetailing of time-tables, etc. In certain districts, such voluntary co-operation, though on a small scale has been attempted for a number of years. The L.N.E.R., for instance, has worked in conjunction with motor bus, or motor coach companies at Scarborough, Musselburgh and in the Lake District. Voluntary co-ordination, however, has been difficult to achieve on a large scale because rivalries and jealousies have prevented the two interests from coming together. The railways naturally wish to subordinate road transport but the operators of the latter can hardly be expected to give up lucrative traffic on main routes and become merely feeders to the railways. Another important difficulty is that any co-ordinated arrangement between a railway and a road transport concern is liable to be attacked by outside enterprises.

Co-ordination through railway ownership or control.—In the second type of co-ordination (*i.e.*, railway ownership or control of road transport) the railways would be the predominant partner and road transport would be

organised as a subsidiary. The danger of this type of co-ordination is that road transport might become too subordinate, though in practice this contingency is unlikely since strong vested interests have grown up in road transport. In Britain, where there are four main railway groups, it is possible that the operation and ownership of road vehicles might increase inter-group competition, since road transport operated by one railway company could penetrate into the territory of another group. In this manner wasteful competition might be encouraged and overlapping and duplicated services might be organised. The difficulty could be overcome by the formation of one large road transport company by the four big railway groups, jointly financed. At one time, it seemed probable that such a company might be inaugurated, but now it appears that these proposals have been dropped, though it is evident that the railway groups do not intend to invade each other's territory.¹ Thus when the Western National Omnibus Ltd. was formed in the beginning of 1929 to take over the road services formerly operated by the G.W.R. and the National Omnibus and Transport Company in an agreed area comprising the greater part of Devon and Cornwall, the area served by the Southern Railway was specifically and definitely excluded.

From the point of view of railway operating economies, there are many uses to which a subsidiary road transport service could be put by a railway administration. Road services could be substituted for unremunerative branch lines which in some districts are a serious financial drain on the companies ; circuitous rail routes could be avoided ; and road vehicles could be used to relieve traffic congestion on a saturated railway line, thus obviating the need to increase line capacity with its attendant expense of improving signalling, doubling the lines or introducing electric operation. Road vehicles might also be usefully employed during periods of seasonal activity, since they could be transferred from one part of the country to

¹ In Yorkshire the L.N.E.R. and the L.M.S.R. have combined to finance jointly a number of important agreements with motor bus concerns.

another as required. The efficiency of the rail system would be increased by the provision of "feeder services" in the areas surrounding various stations. Goods traffic to and from intermediate stations could be handled more cheaply and more expeditiously by motor road vehicles than by the railway's "pick up goods trains" or "road vans." Where goods could be brought direct to a central depot by road, the inconvenience, delay and expense of railway transhipment might be avoided. Railway passenger trains could be speeded up and facilities improved by the use of co-ordinated motor bus services for local traffic. Inclusive rates and fares could be quoted to encourage through traffic of all kinds. Some of these advantages might be obtained by voluntary co-operation between road and rail companies, but as has already been indicated there are certain practical difficulties in the way. The railways, moreover, would seem to prefer to operate or control their own co-ordinated road transport, since this enables them to achieve a more definite subordination of road services, and since the services can be readily fitted in to suit the necessities and conveniences of rail transport.

Complete co-ordination, through railway ownership or control of the other forms of transport, would mean a railway monopoly of inland transport services, and this is the very ground upon which the greatest exception was taken to the grant of Road Transport powers. To prevent the attainment of such a monopoly, certain restrictive clauses were inserted in the Acts.

Statutory co-ordination.—Quasi-legal or statutory co-ordination might take several forms. Some measure of control over the issue of licenses might be all that would be attempted and the various undertakings might be left free in other respects to work out their own problems. At the other extreme a comprehensive system of complete compulsory co-ordination might be introduced, whereby the various transport concerns would be required to compose their differences and to evolve a system of co-operative working. Failing voluntary agreement, authority would step in and set up a compulsory scheme of

co-ordination. Such a complete species of co-ordination would mean the recognition of some form of monopoly and would imply some measure of control in the public interest. The London and Home Counties Traffic Advisory Committee suggested a scheme of co-ordination of this type as the only solution of the London traffic problem, and in this scheme the essential characteristics were (1) common management, (2) pooling of receipts to enable prior charges to be met by all the participants, and (3) a controlling body to safeguard the interests of the public. There would be considerable difficulties in extending compulsory co-ordination over the whole country, though as explained earlier, a solution might be found in the establishment of regional traffic authorities which would control the passenger transport facilities of their areas. If such a scheme of statutory co-ordination were adopted, care would have to be taken that the development of the means of transport was not hindered. Experience of railway regulation shows how difficult it is to frame suitable regulations of a general character which will not hamper future developments. One important advantage of quasi-legal, or statutory co-ordination over the other types, is that new road enterprises would not be allowed to compete with established routes unless a need for their services could be proved. Under other types of co-ordination, a new road transport concern might wreck the scheme of co-ordination by coming in and taking the cream of the traffic. It would be necessary, however, to provide for the protection of the interests of small enterprises which perform a necessary public service or which have pioneered new routes. Moreover, the scheme should be sufficiently elastic so as to allow new enterprises to come in where it could be shown that there was need for a new service, or where the service provided by existing enterprises was unsatisfactory.

In Britain, statutory co-ordination is almost universally discussed in terms of passenger transport, though in the United States, where recently there has been much controversy about the regulation of road transport, the control

of both passenger and goods transport is usually contemplated together. It is obvious that any scheme of regulation which applied solely to passenger traffic would be incomplete, though it is possible to conceive passenger transport being co-ordinated under some public authority, and goods transport being co-ordinated by voluntary agreements or through railway ownership and control. So far in Britain the subject of co-ordination has generally been regarded in a piece-meal fashion and less attention has been paid to the question of goods traffic than to passenger traffic. The relationship of road and rail transport to the other forms of communication has hardly been considered at all, though in 1928 the four railway groups decided to promote private Bills in Parliament for the purpose of obtaining air transport powers similar to those which they now enjoy for the operation of road vehicles. These powers are being sought so that the railways might be able to participate in the new form of transport when it develops. Before this, Imperial Airways Ltd. had put forward tentative proposals for rail and air co-ordination.

The control of motor bus licences.—In many quarters, it is being suggested that the first step towards the evolution of a co-ordinated transport system and the elimination of wasteful competition should be made by the reform of the present licensing system.¹ It is urged that such reform would relieve congestion on the streets and would eliminate duplicated and unnecessary services while at the same time it would enable due control to be exercised in the public interest. In this demand for reform, municipalities, tramways, railways and other interests are agreed that improvement is essential. Under the present system, before any motor bus or motor coach can "ply for hire" within a county borough, urban district or certain rural districts, a licence must be obtained from the appropriate local authority. In 1928, there were some 1,330 such

¹ To prevent any possibility of confusion, it should be mentioned that licensing here refers to the licensing of vehicles plying for hire and not to motor taxation licences.

authorities in Great Britain, representing in some cases very small communities, though certain authorities do not exercise the powers which they possess. Appeals are allowed to the Minister of Transport when a licence is refused or when it is granted subject to conditions. The Minister, after hearing evidence, can make such order as he thinks fit and this order is binding upon the local authority.

It must be admitted that the present system is unsatisfactory and anomalous. In the first place, municipal transport services and company-owned tramways are not allowed to operate motor bus services without the express sanction of Parliament, as they are statutory undertakings and can only carry out those services for which they have specific powers. Again, in the case of municipal services, certain towns have powers to operate outside their administrative areas but others, indeed the majority, have no such powers.

In the second place, the railways are under certain definite restrictions in the operation of their road services, *e.g.*, they may not compete with statutory municipal transport undertakings, though they may do so with statutory tramway companies owned by private enterprise.

Independent motor bus companies suffer from no such restrictions and have merely to comply with the licensing regulations of various local authorities. The limitations imposed on municipalities and tramways are felt to be heavy by these undertakings and there has been much agitation to secure less onerous terms. It is said to be anomalous that these statutory concerns should have to apply to Parliament for permission to operate buses whereas others need not do so. The position, it should be noted, is the same whether the buses are required to supplement or replace tramway services. To obtain the necessary permission, considerable expense is entailed in promoting a Private Bill in Parliament. In evidence before the Royal Commission on Transport, the case of the Ramsbottom Urban District Council was cited as an

example of the expense involved. The Council promoted a Bill in 1926 to obtain motor bus powers and the cost of obtaining these powers amounted to £2,025 or 2s. 7d. per head of the population of the district.¹

Complaints of the way in which licences are issued have been frequent, and it is asserted that the local authorities favour their own municipal transport or that the small bus operator is at a disadvantage, compared with large vested interests, while on the other hand, municipal tramways complain that the licensing committees of the town councils do not consider the adequacy of the services provided by the trams.²

At any rate, there is no uniformity in the practice of the various authorities, and in some districts licences have to be obtained, but in others, there is no such necessity. To a slight extent a certain minimum of uniformity is obtained through the right of appeal to the Minister of Transport.

Parliamentary limitations on competition.—During the past few years, certain important developments in regard to the regulation of passenger transport facilities have taken place, which are of especial interest. The most important of these developments, *viz.*, the London Traffic Act, 1924, and the new system adopted in Northern Ireland, are discussed at length in later chapters.³ These are exceptional in that they are general in their scope; but in a number of Private Acts, relating to specific undertakings, Parliament has legislated to restrict competition where a satisfactory service is given by a statutory concern. Thus, in 1926, the *Greenock and Port Glasgow Tramway Company* obtained a Private Act of Parliament which included provisions designed to limit competition with the *bus services* of that company. This protection is of special interest in view of the fact that a private company was concerned and that motor bus routes were protected. Moreover it appears (apart from regulations applying to London) to be the first instance of statutory powers,

¹ Evidence of Mr. W. Chamberlain, General Manager, Belfast City Tramways.

² *Ibid.* ³ See Chap. VII, p. 108 and Chap. IX, p. 129.

designed to prevent competition with bus services, being granted by Parliament.

In 1928, the Nottingham and Derbyshire Tramway Companies' Act (Section 42) in effect prohibited competition so long as the companies provided an adequate service since the number of bus licenses was restricted in the various districts served by the tramways to those in existence on November 30th, 1927. During 1928 similar powers were also obtained by the Perth Tramways.

Protective clauses which aim at the restriction of motor bus competition over routes on which adequate services are provided, have been included in a considerable number of private bills recently introduced by municipalities and tramway companies. Certain municipal authorities are also agitating for protection to their buses and tramways outside their municipal boundaries, both as against private undertakings and railway-owned road transport, and they argue that such protection should include an area of $\frac{1}{4}$ mile from the terminus. Such extensive protection, if obtained, would very largely nullify the powers granted to the railways. Moreover, the claims of those motor bus concerns which already operate in the areas outside such municipal boundaries could hardly be disregarded. The solution of the difficulty, it would seem, is to be found in some form of regional co-ordination rather than in the grant of indiscriminate protection against competition.

Another question raised by the grant of protection to bus and tram routes is that of the taking up, and setting down of passengers by long distance bus services which terminate in, or pass through, the protected areas. Co-ordination implies that the maximum advantage should be taken of existing facilities and that duplication and under-loading should be avoided. In Belfast, the difficulty has been overcome by the adoption of a novel method of co-operation. The municipality purchases the empty seats during the periods of light traffic from long distance bus concerns which pass through their city and they utilise these services to provide short distance facilities.

In Edinburgh, though no statutory powers exist to

protect the tramways, competition between long distance buses and the municipal transport system has been eliminated, as the bus company charges higher minimum fares along the tramway routes. This, the bus company has been willing to do, as it is not to their advantage to have their buses crowded out by short distance passengers.

There seems to be a growing concensus of opinion that regional traffic area committees or commissions should be appointed to take over the duties of the local licensing authorities. These new authorities would undertake the issue of new licenses and would regulate the provision and conditions of service on the routes in their area. Details such as stopping places, fares and routes within towns, might be left in the hands of the local authorities, which presumably would have a better knowledge of local requirements. Already certain authorities have grouped themselves together so as to be in a better position to consider the needs of their areas as a whole. In Tees-side, for example, an advisory committee has been formed, which represents all the licensing authorities in that area, though it has no statutory powers.

If the suggested reform of regional committees were adopted, some co-ordinating authority would have to be set up which would hear appeals and adjudicate when neighbouring committees were unable to agree in regard to applications for licenses on routes which extended over more than one area.

The limitations of transport co-ordination from the point of view of the Public.—All schemes of co-ordination have certain important limitations though these vary according to the precise nature of the different schemes. The most obvious danger which may lie in co-ordination policies is that a monopoly may be obtained which could be exploited against the interests of the public. It would be no solution of the evils which arise from competition, if for them were substituted the evils which may arise from monopoly. If the elimination of competition gave monopolistic powers to the co-ordinated enterprises, it is possible that old methods of transport might be continued

and innovations checked. If combinations or agreements were effected without writing down capital, where that was really essential, overhead costs would be unduly inflated and inefficient enterprises, which under competitive conditions would be forced into liquidation, could be bolstered up. The absence of rivalry, it is frequently argued, would check enterprise, since the stimulus of competition would be absent. Competition, it must be admitted, though it may lead to unnecessary and wasteful duplication of services, has certain counteracting advantages from the point of view of the travelling public and traders. In certain circumstances, under a competitive régime, more frequent services may be given, traders may get more individual attention and passengers may obtain more civility and greater comfort. Competition stimulates enterprise and innovations, while under monopoly there might be a temptation to follow routine methods and for bureaucracy to be introduced into the management of the organisation.

It does not follow, of course, that all, or any, of these evils would result from the adoption of the principle of complete co-ordination, but it is necessary to guard against the possibility of developments which would not be in the public interest. It is, therefore, more than probable that the evolution of any scheme of co-ordination on a general scale—whatever be its exact nature—would result in a demand for governmental intervention.

To prevent the possibility of the development of anti-social monopolistic policies, if co-ordination, either voluntary or statutory, becomes general, some method of control will be necessary. Elaborate regulation is not desirable, if any simpler method suffices, and it is probable that the public would be sufficiently protected, if the Ministry of Transport or the Railway Rates Tribunal were given powers to investigate abuses and to shed the light of publicity (with the threat of Parliamentary action where necessary) on any instances of the exploitation of the public. Experience has shown that this simple and direct method is as useful as any other for the public regulation of trusts and monopolies and it should prove sufficient in

the case of co-ordinated transport. Such control would also be necessary if the type of co-ordination adopted were that of regional committees since they would be concerned mainly with local areas and local problems.

The indications at the present time are that some form of co-ordination will have to be adopted. If the various transport interests cannot of themselves introduce a system of co-ordination, it is probable that the task will have to be undertaken by some statutory body. The demand is most urgent in the larger cities and in these, the most likely solution to be adopted is that of quasi-legal or statutory co-ordination in regional areas. The wider question of co-ordination of both goods and passenger transport throughout the country is more difficult, since statutory regulation, unless wisely planned, might restrict transport developments. The history of the early attempts to regulate railways afford ample illustrations of the difficulties attending general legislative regulation. The easiest solution would be a system of voluntary co-ordination between the railway and road interests and as is shown in the following chapter some progress has already been made in this direction. It would appear that the railways are anxious to proceed by way of voluntary co-ordination with large municipal and independent motor bus concerns and they have stated that they do not intend to enter into general competition with established undertakings.

CHAPTER VI

THE RAILWAYS AND ROAD SERVICES

BRITISH railways have been somewhat slow to adopt mechanical road transport as an auxiliary to their rail facilities, though they have for many years past made considerable use of horse vehicles on collection and delivery services.

Before the War, only a few railway companies provided road services. The G.W.R. in 1903 introduced a motor bus service between Helston and The Lizard, and it can, therefore, claim to be the first railway company to realise the possibilities of motor transport, used in conjunction with rail services. Other services were inaugurated by the Company as time went on, mainly as "feeder" and development services in sparsely populated districts. The provision of these road services, it is said, has considerably increased the popularity of the West Country as a holiday resort.

Between 1904 and 1906, on application to Parliament, statutory powers to run road services were obtained by the Great Eastern, the North Eastern, the North Staffordshire and the Great North of Scotland Railway Companies. The last named in 1904, instituted a motor service from Braemar to Ballater, and eventually came to operate a number of services supplementing their rail facilities around Aberdeen, Banff and Elgin. This Company also employed a number of road "steamers" to carry goods between the main stations and outlying districts. Coal, manure, etc., formed the main outwards traffic while grain and other agricultural products were brought back for dispatch by rail. These facilities provide an interesting anticipation of the recently established road-rail services for farmers. In 1919, the Company declared that they had found road

vehicles were valuable as a means of improving transport facilities in the districts served, but that the road services did not allow the traffic to be fully developed.¹

Before the War, Parliamentary action in regard to the grant of statutory road powers was not uniform, since applications were rejected in the case of the Great Northern, the London and South-Western, and the London, Brighton and South Coast Railway companies. Certain other railways inaugurated road services without any Parliamentary sanction but no objection appears to have been made at the time. The Lancashire and Yorkshire, the London and North-Western and the South-Eastern and Chatham Railways, for instance, utilised motor vehicles for a variety of purposes such as the relief of congestion, rapid transit of goods between terminals and depots, or even for regular transport between certain places where circumstances made road transportation more economical than rail haulage.

Post-war developments.—Road services were not regarded by the railways as of any great importance until post-war developments in mechanical road transport led them to view road services in a new light, and they became anxious lest they should be debarred from utilising the new mode of transport. When the Railways Act 1921, was being drafted, they sought the insertion of a clause which would give the necessary powers to operate road services. The Speaker ruled, however, that such a clause was out of order and would require special legislation. In January 1921, a Departmental Committee, under the chairmanship of the late Mr. J. H. Balfour Browne, was set up by the Minister of Transport

“To enquire and report whether it is desirable that the railway companies should have general or limited power to carry goods by road and if so, what, if any, conditions should be attached to the exercise of this power.”

The Committee failed to reach a unanimous conclusion, though the Chairman—the only impartial member—and

¹ Report of Committee on Rural Transport (Scotland), 1919.

the railway representatives advocated the grant of restricted powers to the railway companies.

In 1922, certain constituent companies of the newly amalgamated London, Midland and Scottish Group—viz., the Caledonian, the Glasgow and South-Western and the Highland Railways—presented a Private Bill in Parliament for the purpose of securing road powers. A Select Committee was appointed to consider the application, but after a ten days' sitting the Bill was withdrawn by the Promoters. The cause of the withdrawal was stated to be the unexpected opposition of the Ministry of Transport in regard to the question of charging powers.¹

The Railway Companies' Road Transport Acts, 1928.—After this rebuff, the railway companies took no further action in the matter until 1928, when the four groups together with the Metropolitan Railway Company, introduced Private Bills for the purpose of obtaining road powers. Conditions had changed considerably since 1922, as road transport competition had become much more severe. A Select Committee of the two Houses was appointed to take evidence which was led at such great length that the proceedings occupied 37 days. The main argument of the various opponents to the Bills centered on the evils which might result if a monopoly of the means of inland transport was obtained by the railways through their great capital resources. With the exception of the Metropolitan Railway the Companies eventually obtained the powers which they sought, though the opposition had made a sufficiently good case to obtain the imposition of various restrictions. By the Acts, each of the four groups are empowered to

“provide, own, work and use road vehicles to be drawn or moved by animal, electrical or mechanical power in any district to which access is afforded by the system of the Company.”

In the London Traffic Area, however, they were forbidden to convey passengers by road, except to and from places

¹ For a fuller account of these matters see the author's “Economics of Road Transport.” Chap. XVI, pp. 192-204.

outside that area. This provision was no doubt due to the fact that already legislation had been passed to prevent undue congestion of road vehicles on the streets of London.

Municipal undertakings obtained protection for their services in their own areas and the railways are prohibited from running competitive vehicles where any municipality is already providing an adequate and satisfactory service of trams or buses. They are also prohibited in similar circumstances from entering into agreements with any other road concerns competing with municipal trams or buses. The Minister of Transport is given power to determine the adequacy of any such services.

Agreements may be made with any municipality, company or other concern, operating road transport services except in the London area; but notice of any such agreements must be given to the Minister of Transport and any limitations imposed on the railway companies are held to apply to such joint services.

The Minister of Transport must also be informed of any services inaugurated and worked by the companies themselves under the provisions of the Acts, and such services, (with the exception of experimental services) may not be withdrawn unless published notice is given and an opportunity provided for the hearing of objections to such withdrawal. Seasonal services, however, may be operated at the Companies' discretion.

Certain restrictions as to charging powers were also inserted in the Acts for the purpose of safeguarding the interests of the public. The Companies are permitted to charge reasonable rates and fares for their road services, but such charges must be recorded at appropriate railway stations or depots and must be open to public inspection. Rates and charges are subject to the review of the Rates Tribunal, on application being made by those interested in the charges, and the Tribunal is empowered to make any modifications which shall seem just.

Other restrictions imposed by the Acts include a prohibition of the manufacture of motor vehicles (other than the bodies) by the railway companies, and the prohibition

of the use of bridges, maintained by the railways, where such bridges may not be used by other road vehicles. Road transport enterprises are deemed to be ancillary businesses under the Railways Act, 1921, and the effect of this is to prevent the companies operating their services at a loss for "rate cutting" purposes, since if revenues are "unduly low" the "standard charges" of the company may be reduced by the Rates Tribunal. The Minister of Transport may at any time, if he considers that the interests of the public are prejudicially affected, order an enquiry to be held and if necessary may report thereafter to both Houses of Parliament.

In short, the position is that the railways have obtained road powers but municipal enterprise has been protected, and the companies may not compete in the London area. Some regulation of their charges has been secured and they have been prevented from establishing temporary competitive road services to drive their rivals off the roads. Finally, the exploitation of a rail-cum-road monopoly, if such were attained, is prevented by the power of investigation and report given to the Minister of Transport.

Railway motor bus services.—On obtaining their Road Transport Acts from Parliament, the four groups immediately took active steps to avail themselves of the new powers. With a view to giving effect to a policy of co-ordination, they entered into discussions with their road competitors and in a short time terms were arranged with a number of municipal and private owners whereby the railways acquired an interest in inter-urban passenger road transport, either by purchase or by joint operation. Some of the first agreements were made with municipal transport undertakings as it was found easier to deal with these than with private concerns, owing to the great number of the latter in many districts. In the Summer of 1928, the G.W.R. and the Caerphilly Urban Council agreed upon a scheme of joint ownership and joint working of the Council's bus undertaking. This appears to have been the first fruits of the new Acts, though it was soon followed

by an important fusion of interests in the Sheffield area. On January 1st, the L.M.S.R. and the L.N.E.R. entered into an agreement with Sheffield City Council whereby co-ordination between the City's transport and the railways' road enterprises was attained over a wide area. The City's former municipal services were subdivided into three divisions. *First*, bus routes which both start and terminate within the city boundary remain the property of the Corporation and do not come into the agreement. *Second*, on the shorter routes to places outside the city which were formerly operated by the Corporation, the two railway companies have obtained a joint interest with the Corporation. *Third*, bus routes over longer distances from the city to other towns, have been handed over to the railways. On one of these routes—Sheffield-Rotherham-Doncaster—the city had only an 18 per cent. share and this share has been taken over by the railways.

Buses in the first category are operated entirely by the city, but those in the second are operated by the City Tramway's Department subject to the control of a joint committee. These vehicles bear the names of the Corporation and the two railway companies, and where possible the joint services have been arranged so as to provide connections with suitable trains. The railway companies paid to the Corporation the sum of £83,000 in respect of half ownership of 55 buses operating on the joint routes and entire ownership of 14 buses working the long distance routes.

On January 2nd, 1929, another important agreement was effected with a large bus company—the *National Omnibus and Transport Company*—and the *Great Western Railway*. A new company was formed known as the *Western National Omnibus Company Ltd.*, on the board of which the railway and the old bus company were given equal representation. The new concern has an authorised capital of £1,000,000, and has taken over all the road services of the two parties in an agreed area comprising the greater part of Devon and Cornwall, West of Exeter, but excluding territory served by the Southern Railway.

The G.W.R. has been especially active in the development of its road policy and in March 1929 another big amalgamation was effected which involved an important combination of several distinct road interests under railway auspices. The agreement was effected in the first place between the *Great Western Railway* and the *South Wales Commercial Motors (Limited)*; the latter undertaking at the same time being enlarged and its name changed to the *West Wales Commercial Motors (Limited)*. On 1st April, 1929, the new company commenced operations, having incorporated the road services of two other firms—*Lewis and James* and the *Western Valleys Motor Services (Limited)*—together with all the road services of the G.W.R. and the South Wales Commercial Motors Ltd. The new company provides passenger services over all the industrial regions in Wales, and has a capital of £500,000. As in other mergers, a joint board has been set up, consisting of an equal number of representatives of the railway and the amalgamated bus concerns. Some months after this agreement was effected, the G.W.R. acting in conjunction with the L.M.S.R. bought out the *Crosville Motor Co. Ltd.*, which operated numerous services in North Wales, Cheshire, Lancashire, Shropshire, Staffordshire, Flintshire and Derbyshire.

In addition to the services worked under these various agreements, the G.W.R. has been active in developing motor bus services on its own account in other parts of its territory. One of the most important of these is a combined road and rail service between Cheltenham and London; the 40 miles between Cheltenham and Oxford being covered by the Company's motor coaches and the remainder of the journey by rail. In the area served by the Great Western Railway, where practicable, road and rail tickets on parallel routes are available on any of the Company's trains or buses, according to the wishes of the passengers.

The *National Omnibus and Transport Company Ltd.* have also effected an agreement with the *Southern Railway* for the operation of bus services in Devon, Cornwall,

Dorset, Somerset and Wiltshire, whereby a new company with a capital of £500,000 has been formed, called the *Southern National Omnibus Company Ltd.* This concern has taken over the services of the parent company in the districts named and operates them in the joint interest of the original road company and the Southern Railway. The capital has been subscribed in equal shares by the two parties to the agreement and each has been given equal representation on the board of the new concern. Sir John Jarvis, the Chairman of the National Omnibus and Transport Company, in discussing the various agreements effected by his undertaking with the railway companies has stated that—

“ The object of these arrangements is co-operation between the omnibuses and the railways instead of competition. Up to the present the omnibuses have been fighting the railways, and the fight has not been good for either of them. The success of the arrangement depends on whether the railway companies really intend to co-operate with the road services and I am hopeful that they do. I am convinced that the movement will be in the best interests of the travelling public in the long run. Though it cannot, in view of the high cost of petrol, result in any decrease in omnibus fares, there is no question of putting fares up and in due course it will certainly mean, gradually, new services and extensions of the existing services.”

The importance of the agreements effected by the Great Western and the Southern Railways with the National Omnibus and Transport Company can be realised from the size of the business transacted by the latter concern. In May 1929, this company is reported to have owned 55 garages and 861 vehicles, and during the previous year they operated 342 routes over 4,496 miles of road, running nearly 18 million miles and carrying some 52 million passengers.

In March 1929, the L.M.S. and L.N.E. Railway Companies effected an agreement with Halifax Corporation very similar to that concluded earlier with Sheffield Corporation. After the 1st April 1929, the two companies by this agreement became associated with the Corporation

in the operation of the existing bus routes, while certain other routes were taken over entirely by the railway companies. The agreement provided that bus routes entirely within the borough were to remain in the ownership and under the control of the Corporation, but those extending beyond the city boundary came under the control of a joint committee. Any bus routes which may be developed further afield than those now worked are to be operated entirely by the railways. To provide co-ordination with the railways, certain of the existing routes have been extended to the railway station in Halifax. In June 1929, the two railway companies acquired a private company (*Hebble Bus Services*) operating in and around Halifax and on routes extending to Huddersfield, Leeds, Bradford and Burnley. This development has been followed by an agreement with Leeds Corporation similar to that reached with Sheffield Corporation, whereby for co-ordination purposes the bus routes have been divided into three categories. The railways are now in a position to co-ordinate practically all the road and rail services in an extensive region around Halifax, Leeds and Sheffield.

In Scotland the L.M.S. and the L.N.E.R. have effected an important agreement with the *Scottish Motor Traction Co. Ltd.*, which latter, together with its associates, handles an important share of Scotland's bus traffic. A new company was formed with a capital of £1,800,000 in which the railway companies acquired a substantial interest, and the three companies have agreed to co-operate in the provision of road and rail services.

Another interesting development has been the co-operative purchase of the *United Automobile Company* by the L.N.E.R., and an independent motor bus company—*Messrs. Thomas Tilling Ltd.* The United Automobile Company operates some 2,000 route miles in East Anglia, Durham, Northumberland and Yorkshire, and as *Messrs. Tilling* control a large number of other companies in the East Coast area, a very considerable measure of co-operation between road and rail in that area should result.

The acquisition by the L.N.E.R. of a substantial holding in the *Northern General Transport Company*, which operates in the County of Durham, has further strengthened their position in the North-East.

The railways and goods carriage by road.—It is significant that all the earliest agreements which have been formed between road and rail interests referred without exception to passenger transport. Goods service co-ordination presents more difficult problems as competition is keener among road hauliers than among bus companies, and there has not been the same tendency towards amalgamation as in the passenger side of the road transport industry. There are, however, a certain number of larger concerns in the motor haulage business and if agreements were effected between these and the railways, it is probable that a number of smaller firms would be willing to be bought out. Though less activity has been displayed by the railways in entering into agreements with road hauliers, they have not been idle in other directions. The aim of the railway companies would appear to be the retention of as much traffic on the rails as is possible and to this end, they have attempted so to develop their road auxiliaries in the case of goods traffic, that part at least of the journey will be made by rail. Thus all the recent developments of the past few years have tended in this direction ; Railhead deliveries and storage, the increased use of containers, and the institution of motor lorry services in rural districts. Road collection and delivery services have been extended, it is true, but the object has been to avoid transhipment at the railway depots.

Road transport can provide important "feeder" services to the railways,¹ and during 1927 and 1928, the G.W.R. introduced a policy of providing motor lorry services to link up rural districts with their railway stations and this policy it is said has been amply justified by the results obtained. By the end of 1928 the total number of such services was between 80 and 90, and since then many

¹ In less developed countries than our own there is an even greater scope for such extensions.

new services have been inaugurated. Concurrently the employment of motor lorries made possible the extension of cartage boundaries in many areas.

Since the passing of their Road Transport Acts, the railways have been able to utilise road vehicles (except where these vehicles are engaged on special contracts) for collection and delivery of traffic between places situated on the route. Formerly it was *ultra vires* for the companies to undertake direct transport of goods by road where consignments did not pass over the railway system for a part at least of the journey.

Combined road and rail services in rural districts.—The L.N.E.R. has been a pioneer in the development of rural lorry services, radiating from appropriate base stations, villages, etc. Motor vehicles are employed to send out agricultural requirements and to bring back the agricultural produce of the district to the railway station. In 1927 and 1928, at more than 600 stations on their system, co-operative road collection and delivery services were introduced by arrangement with local motor hauliers for the carriage of farm produce and certain other commodities at specially low rates. Considerable success has been achieved by the new facilities in districts as diverse as Northumberland, Durham, Yorkshire, East Anglia and Haddington, though one example of these services should suffice to illustrate the methods which have been employed. On January 23rd, 1928, a road collection and delivery service for agricultural and other bulk traffic was introduced by the Company within 10 miles radius of the following stations in the South-east of Scotland: North Berwick, Dirleton, Drem, Gullane, Aberlady, Haddington; East Linton, East Fortune, Innerwick, Cockburnspath and Dunbar. The rates charged in certain districts are given in the following table. These rates apply to traffic, packed, bagged or otherwise easily handled and are subject to a minimum charge as for two tons.

TABLE XIX

Rates for Road Collection and Delivery of Agricultural and other bulk Produce.

Distance	Grain, Potatoes, Oil-cake and artificial manure	Other Bulk Produce
	Per ton	Per ton
Up to 2 miles	1/9	2/6
Over 2 miles and up to 3 miles ...	2/-	3/-
" 3 " " 4 " ...	2/3	3/6
" 4 " " 5 " ...	2/6	4/-
" 5 " " 6 " ...	2/9	4/6
" 6 " " 8 " ...	3/-	5/-
" 8 " " 10 " ...	4/-	6/-

In certain districts the L.N.E.R. have extended these rural motor services so as to provide a daily collection and delivery service for all descriptions of traffic conveyed by goods train. Thus on April 16th, 1928, a service of this nature was provided for the villages of Balfron, Buchlyvie, Drymen and Killearn. Orders for the collection of traffic can be given either to the motor-man or the stationmasters. The aim of the service was to meet the demand for cheap, reliable and expeditious through transport facilities.

The charges for sundry traffic are set out in the table below and illustrate the nature of the facilities provided and the small consignments which are accepted.

TABLE XX

Charges for the road conveyance of sundry traffic to and from certain stations.

Station.	Rates for small consignments.								Rate per ton
	14 lbs.	28 lbs.	56 lbs.	1 cwt.	1½ cwt.	2 cwt.	2½ cwt.	3 cwt.	
Balfron									
Buchlyvie	3d.	3d.	5d.	7d.	8d.	10d.	1/-	1/2	3/4
Drymen									
Killearn									

Above 3 cwts are charged at tonnage rates provided the amount is not less than that for 3 cwts.

Through rates are also quoted to these villages from Glasgow, including rail transport, collection in Glasgow and delivery in the villages.

The L.M.S.R. has also opened distribution centres at a considerable number of stations. From these centres, artificial manure, linseed cake and other agricultural materials are delivered as required to the farm houses by lorries which also pick up the produce of the farms and take it to railhead for immediate dispatch to the markets. In the L.M.S. railway company's scheme additional facilities such as warehousing are provided at many of the centres. These refinements have been based on a system known as railhead deliveries which has proved very successful in urban and industrial centres. More recently the Southern Railway has established a number of railhead distribution centres and country lorry services, which provide for the collection and delivery of goods and merchandise within a radius of ten miles of each centre.

Railhead delivery.—The L.M.S. have been pioneers of the railhead delivery facilities whereby merchandise conveyed by express freight trains in bulk from factories, wholesale warehouses or importing centres is warehoused at the railhead depot. There bulk is broken and the goods are sorted out so that delivery may be effected as required by means of the railway company's road transport. In effect, railhead delivery, which has now been adopted by the other groups, means that the railway company acts as the cartage contractor for wholesalers and manufacturers, performing extraneous services as required in addition to rail transport. Distributors are thus provided with a rail base on which dispatches for a particular area can be concentrated and from which a radial road service effects delivery over a wide area of towns and villages. Delivery can also be given to the actual sites where commodities such as bricks, road metal or electric cables are required. Traders utilising the services also obtain many other important advantages, such as lower rates for large consignments, a saving in packing costs, the elimination

of returned empties and more rapid transit and delivery. Railhead deliveries afford an excellent example of adequate road and rail co-ordination, as they combine the advantages of bulk transport at high speeds which the railways have to offer, with those advantages of door-to-door deliveries at times and in quantities suitable to the needs of each individual consignee, which are possible only by using the highly mobile and flexible motor vehicle.

Containers.—The railways are also attempting to gain some of the advantages of road transport for rail traffic by popularising the more general use of containers. The container is in effect a demountable body which can be slung on either road vehicles or railway trucks. It provides a means whereby goods can be conveyed from door to door without disturbance, though the container itself is exchanged between rail and road vehicles *en route*. While containers are by no means a new device, the railways have recently taken active steps to increase their popularity and extend their usefulness. The idea of the container is really very old, since even as early as 1811, when the construction of a "wagon-way" through Nithsdale from Dumfries was being considered, it was suggested that demountable bodies, capable of being slung on board canal barges should be employed. Containers have been in use among furniture removers, confectioners and biscuit manufacturers for many years and they have also been employed on the S.R. for the conveyance of passengers' baggage to Paris.

The great advantage of the container system is that door to door services can be provided. Packing costs are greatly reduced, handling is avoided, the cost of returned empties is saved, and the risk of pilferage is reduced to a minimum since, if required, containers can be locked and sealed. They enable goods services to be speeded up and they are a means of meeting road competition on its own ground of quality of service. Certain limitations, however, attach to the use of containers. Though a variety of sizes have been standardised by the railways, containers can only be used when the consignor has a certain minimum

volume of traffic going to the one destination.¹ They involve the carriage of a certain amount of deadweight, though this is partly offset by reductions in the weight of packing materials. Again where traffic is mainly unidirectional, containers may have to be returned empty, though a counterbalancing saving may be effected since the cost of a flat or open wagon is less than a covered box van. Finally, containers necessitate the employment of cranes and these are not available at all stations. Inventors, however, are busy in devising schemes whereby motor lorries could be employed to draw the containers onto or off railway wagons. Despite its limitations the container is a very economical method of direct transit where conditions are suitable and it is to be hoped that their use will increase.

All the new facilities which are being adopted by the railway companies—motor delivery services, farm services, railhead delivery and the container system—it will be observed are in the direction of providing a higher quality of service by rail, including more rapid delivery, door-to-door services and other special facilities. They are an attempt by the railways to counteract road competition by improved services. When the railways first felt the full blast of road competition after the War, with its emphasis on quality of service and its adaptability to varying requirements, they were not organised to meet the new competition. They were then caught unawares, but now they are putting their house in order and should be able to meet the new competition by the more adequate provision of competitive facilities.

Bus and railway stations.—In conclusion reference must be made to another facility designed to secure co-ordination between road and rail services as it is probable that it will become increasingly popular in the near future. This is the provision of bus stations attached to railway stations. The first important bus station to be established in this

¹ The L.N.E.R. provides three types: two covered, with capacities of 2½ and 4 tons; and one open, with a capacity of 4 tons. In Ireland, the County Donegal Railways utilise containers for the conveyance of petro as they facilitate transfer from narrow gauge to broad gauge trucks.

country was that in the forecourt of Victoria Terminus in London. The facilities were provided through agreement between the L.G.O.C. and the Southern Railway and they effected a great improvement in traffic conditions. Buses plying on 21 routes draw up at the bus platforms in the court of the station ; departures being regulated by light signals controlled from a tower 23 feet high. A regulator is stationed in a cabin in the tower, from which he has a clear view of the five long platforms at which the buses draw up to discharge and load their passengers. The advantage of such control will be appreciated when it is stated that on the average 200 buses depart in the hour.

In London, bus stations have been provided at Golders Green Tube Station and at Kingston-on-Thames. At Golders Green, a very effective system of co-ordination has been effected thereby between the buses and the tubes.

An important extension of the principle of the bus station would be the provision of parking places, or garages for private cars at suburban stations. This should help the railways to retain their first-class season ticket traffic since there is no doubt that many business men would be glad to avail themselves of a facility which would enable them to avoid driving through congested city streets.

CHAPTER VII

ROAD AND RAIL CO-ORDINATION ABROAD

Co-ordination in the United States.—In the United States, considerable progress has been made towards the co-ordination of rail transport with road, air and steamship services. In this movement, the initiative has been taken by the railway companies in the hope of improving their financial position. In 1927, the American Railway Association set up a special motor transport division and this new organisation is expected to play an important part in the future development of co-ordination.

Nearly seventy railroads now operate motor buses either directly, or through subsidiaries, or under contract, while some fifty or sixty railway companies have also introduced road services in connection with their goods traffic facilities. "Store Door" delivery is given by the combined services, while motor vehicles have proved most valuable for the carriage of "less-than-carload" (L.C.L.) traffic. Operating costs have been reduced by cutting out stopping freight trains for traffic at intermediate stations and motors are also extensively employed as "feeders" to the railways. One company, the Great Northern Railroad, has indeed adopted road transport so wholeheartedly that it operates more miles of highway in Minnesota than it has miles of railway.

Co-ordinated passenger services.—Severe competition from motor buses in the United States has forced the railroads to operate bus services of their own or to form agreements with the bus companies. According to the Interstate Commerce Commission more than 1,200 motor buses were operated by Class I Railroads, or their subsidiaries, in 1926 and 1927.

TABLE XXI

Motor buses operated by Class I Railroads, 1927. (Excludes small railroads and contract services.)

District	Railway buses		Competitive buses	
	Number	Route mileage	Number	Route mileage
New England ...	21	84	453	8,599
Great Lakes ...	296	1,974	3,074	38,713
Central Eastern ...	68	243	4,656	38,396
Pocahontas ...	190	3,923	4,618	7,706
North Western ...	14	223	3,044	57,957
Central Western ...	659	4,950	3,827	106,708
South Western ...	1	15	1,267	31,406
Southern	4	28	2,170	45,037
Total ...	1,253	11,440	23,109	334,522

Numerous complaints have been made by the railroads about bus competition and they have protested against the grant of "certificates of public convenience and necessity"¹ to motor buses which compete with the railways. Their protests have not been very successful and the great majority of the public authorities concerned have allowed the free and unfettered development of road services. The Public Service Commission of Pennsylvania has been an exception since, as they stated in 1924—

"It has been the policy of this Commission to refuse to permit competition with existing utilities, which have large investment and are necessary for the public convenience if their service is or can be made reasonably adequate. . . . Although such motor services may be more convenient to some shippers than service by electric railway or railroad, consideration of public convenience will not permit the Commission to take action which will endanger the continued financial stability of such established roads (i.e. railways)."

In New England, a definite policy for the co-ordination of motor bus and rail passenger services has been adopted. There, motor buses are utilised by the railroads (1) in substitution for trains where traffic is not heavy enough to

¹ Without such a certificate motor buses are not allowed to operate in the U.S.A.

justify the use of steam trains or petrol rail cars ; (2) as extensions of the rail service ; (3) on parallel routes or as feeders to the railroads ; (4) for service at times when traffic is too light to justify the running of trains or rail cars ; and (5) for competitive purposes where better facilities can be provided by motor bus.¹

In 1924, the Boston and Maine Railroad was the first steam railway in America to substitute motor buses for passenger trains on a branch line where traffic was very light. Since then, this railway has utilised buses in connection with its main line operations for the purpose of eliminating local stops ; the buses providing a service to intermediate stations. This railway is in the peculiar position that one-third of its total mileage consists of branch lines and many of these were being worked at a loss, until buses and lorries were substituted for rail services. Connections are made at the former junctions with the main line trains and considerable savings have thereby been effected. It is related that in one instance where rail costs were \$2.02 per train mile, a bus was substituted for the train at a cost of only \$0.64 per bus mile.

On branch lines which have not been closed, buses are utilised at periods of slack traffic, trains being run only when traffic is heavy. A number of feeder services have also been introduced. During 1926, the bus mileage operated totalled 1 million miles, some 60 buses being employed. A peculiar system of operating the road services has been adopted. The buses are owned by the railroad company but are leased to a subsidiary concern—the Boston and Maine Transportation Company.

Another important example of a railroad which has adopted road transport as an auxiliary is the New York, New Haven and Hartford Railroad. In 1925, they formed a subsidiary, known as the New England Transportation Company, for the purpose, as they found much traffic was being lost to private cars and motor buses. Petrol-rail cars were first tried out, but these, though successful in certain circumstances, did not suffice to regain sufficient

¹ "Modern Transport," September 8th, 1928.

traffic. About one-half of the routes operated by buses have been inaugurated to replace local passenger trains, while the remainder are feeders or supplementary to the existing railway lines.

The Baltimore and Ohio Railroad, for the purpose of attracting passengers, has inaugurated a service of motor coaches in co-operation with the Fifth Avenue Coach Company of New York, connecting its terminal at New Jersey with Manhattan, Brooklyn and Newark. Three motor coach stations have been opened in New York City, and the most recent of these, situated in Forty-Second Street, is extremely well equipped. Kerbside loading has been eliminated and a ticket office, waiting rooms, luggage check, etc., have been built. An outgoing and an ingoing road are available for the vehicles and the difficulty and expense of providing turning space has been ingeniously solved by the provision of a turn-table.

Freight transport co-ordination.—In 1923, a number of railway companies in the United States commenced experiments in the development of co-ordinated road transport for the carriage of goods and merchandise. Among the first in the field was the Pennsylvania Railroad which in January 1923, formed a subsidiary company—the Baltimore, Chesapeake and Atlantic Railway—to take over a competing motor haulage company, carrying freight from Baltimore to a number of towns on the Eastern shore of Maryland. In July of the same year, two motor trucks were substituted for a local freight train carrying parcels traffic between Pittsburgh and Enon, Pennsylvania. In November, a number of other services were introduced and since then many additional services have been put on from time to time, till at present there are local freight motor services operating from more than 500 stations on the company's system. Zones have been formed in a number of districts for the combined road and rail handling of L.C.L. traffic, whereby deliveries and collections are effected from the zone station by motor trucks, provided under contract by various trucking companies in each zone area.

ROAD AND RAIL CO-ORDINATION ABROAD 105

The New York Central Railroad has also adopted road transport for a variety of purposes such as (1) the elimination of certain "way" trains,¹ (2) the elimination of transhipment, (3) the provision of cartage services from central delivery stations, (4) the interchange of traffic between the railway and lake steamships and (5) container services. For L.C.L. traffic, the zone system has been adopted, and motor services are operated for distances from 10 to 30 miles on each side of the zone station.

Many other American railway companies have also adopted road services in connection with their freight traffic and both in industrial areas and districts of sparse population considerable advantages have been gained from road and rail co-ordination. Co-ordinated services have proved especially advantageous on routes where there are a number of small stations, spaced out along the line. Road vehicles can give a better service and can reduce operating costs by eliminating local freight trains formerly necessary for the collection of L.C.L. traffic.

Containers.—American railways have adopted the container system with beneficial results. One of the earliest container services to be operated in the States was inaugurated by the *New York Central Railroad* in 1922, between New York and Buffalo. Steel containers were employed for handling both L.C.L. and full truck loads. Since then, container services have been provided on other routes and electric cranes have been installed to deal with the traffic. Road haulage, however, is not performed by the railways, as in this country and has to be provided by the firms themselves or by haulage contractors. Nearly all kinds of goods and merchandise are accepted for the service, including low grade traffic, such as bricks, which are carried between large producers and the main centres. An important innovation has been the abandonment of the principle of differential charges for container traffic. Classifications are disregarded and charges are made according to weight and mileage, irrespective of the commodities carried. This has encouraged a number of

¹ i.e., stopping freight trains.

freight forwarders to make a business of collecting traffic and sending in bulk by containers.

Regulation of road transport in the United States.—In the United States, legislation relating to public motor vehicles is complicated by the fact that the various constituent States have powers to legislate for motor transport within their boundaries. They are very jealous of their legislative powers and so it has happened that regulations vary in the different States. In consequence of this diversity of practice, difficulties have naturally arisen as regards inter-State traffic.

Each local and municipal authority has local police powers, to regulate vehicles and traffic with the object of minimising accidents, preventing congestion and securing that the highways are properly used. Common carriers (whether taxi, motor bus or motor lorry) must ordinarily obtain a license from the municipality in which they operate, but in addition, many States lay down that such common carriers must also obtain a "certificate of public convenience and necessity" from the State government, and this generally entails the imposition of additional restrictions. The State certificate and the municipal license decide the territory within which the carrier may operate. Certain States require the carriers to file a bond sufficient to indemnify the public in case of damage through accidents, though liability insurance may be accepted as a substitute. There is, however, no uniformity and no exact division between State and municipal authority and certain variations are to be found in the different states.

Transport undertakings operating in more than one State are regulated by the Federal Government, though considerable differences of opinion exist as to the wisdom of strict Federal regulation of inter-State services. Legislation has recently been proposed whereby common carriers working routes over more than one State would be required to obtain a certificate, declaring that public convenience and necessity required the service. Such legislation is advocated by the authors of a recent American work on

the ground that it would secure a greater degree of co-ordination. They state that the best informed carriers realise

“ that it is of especial importance that motor transport should be co-ordinated with railroad, electric and waterway transportation, and that this can best be brought about by having all agencies of transportation subject to regulation that is intended to promote the balanced development of an integrated system of transportation.”¹

Co-ordination and the regulation of motor transport in Ireland.—In Ireland the average journey is short and the average load is small. Road competition with the railways has, therefore, been severe, though in the Free State for some time after the War, the full development of competition was hindered by the disturbed state of the country and the damage which had been done to roads and bridges, but as the roads have been improved, competition has become more and more intense.

During 1925, the railways of the Irish Free State were amalgamated into one company—the Great Southern Railway—in accordance with the Irish Railways Act of 1924—an Act similar in principle to the British Railways Act 1921.²

Certain of the constituent companies had obtained road powers previous to the amalgamation. The Dublin and South-Eastern Railway, for instance, had been granted limited powers in 1900 for the purpose of running services between their hotels and places of interest, while in 1903, similar powers were granted to the Great Southern and Western Company. In the latter year also the Midland Great Western Railway obtained these powers and in addition was empowered to supply coaches or motors for the conveyance of parcels, passengers or goods in connection with, or in extension of, their railway system. Except in the last case the powers were very definitely limited and even the Midland Great Western Company was restricted to routes which started from one of their stations.

¹ *Johnson, Huebner and Wilson*, “Principles of Transportation,” p. 455.

² The Great Northern Railway (Ireland) was excluded from the Act as it covers territory in Northern Ireland.

In March 1927, a Bill was introduced into the Dail with the object of conferring road powers on the Great Southern Railway. This Bill was passed as the Railways (Road Motor Services) Act 1927, and it authorised the railways to run motor services subject to certain limitations. Routes must be approved by the Minister of Industry and Commerce who also has power to prescribe maximum charges. A service once established cannot be withdrawn without his sanction and rates may not be raised without his permission.

In Northern Ireland, an attempt has been made to effect co-ordination and to regulate the operation of road transport by means of new legislation. Power to license public vehicles has been taken out of the hands of local authorities and vested in the Minister of Home Affairs, who has also been authorised to regulate motor bus routes throughout the Six Counties. The first licenses issued by the Government under the new scheme allowed vehicles to operate in any part of Northern Ireland, but after a twelve months' trial it was found that congestion was occurring in the large cities, especially during the "rush hours," owing to the general permission accorded to all licensed vehicles to run where they pleased. In December 1928, therefore, the regulations were amended and the number of vehicles was limited and the routes over which they could operate were specified. The present position in Northern Ireland is that the licensing and control of all public motor vehicles is in the hands of the Central Government, though local authorities are free to make by-laws to prevent congestion, restrict the operation of buses on certain streets, etc. In evidence before the Royal Commission on Transport, Mr. W. Chamberlain, the General Manager of the Belfast Tramways, stated that complete co-ordination of the various road services had been effected and that the operation of the new system was most successful. Congestion had been removed, wasteful competition eliminated and the fullest use made of all the available means of road transport. An interesting feature of regulation in Northern Ireland is that licenses are not saleable

or transferable. This prevents the larger concerns buying up smaller fleets with the object of establishing a monopoly in road transport. In Belfast a novel form of co-ordination which has been referred to in an earlier chapter has been inaugurated by the Corporation Transport Undertaking, which purchases seats on various long-distance buses running through the City at times when they are usually underloaded.

Road and rail transport in Germany.—In Germany, road competition has been chiefly felt by the railways for distances up to 100 kilos (62½ miles). The German Railway Company found that tariff reductions were not sufficient to regain lost traffic and, therefore, in March 1924, they concluded an agreement with all the large motor transport companies which were then united into one concern. Co-operation was effected by this agreement between the two groups of interests and a considerable number of "rail and motor lines" were organised both for passenger and goods traffic. The railway forwarding offices undertook to act as receiving depots for both rail and road traffic.

During recent years, there has been a considerable growth in road competition and a large number of motor services have been organised by the Postal Administration and these services now carry some 50,000 passengers per year in addition to the mails. The Railway Company, it would appear, is anxious to conclude agreements with the Post Office, and it is also desirous of operating road services on its own account. It has, therefore, abandoned its policy of acquiring new holdings in the shares of independent road transport companies, though it is retaining those which it has already obtained. It has also attempted to meet road competition from motor lorries by granting a large number of special tariffs known as the K. Tariff.

Road and rail co-ordination in other countries.—In France the P.L.M. operates over 150 motor coach services by means of concessions granted to road transport companies, the railway retaining the right to arrange time-tables, fix fares, etc.

In South Africa, road competition with the railways of the Union has become more and more acute during recent years. The railway mileage of 12,000 miles is small compared with the area of the Union, and in the circumstances, it might, therefore, be thought that road transport development would be greatest in the rural areas. Road transport, however, has developed most in the areas served by railways rather than in the more sparsely populated parts. For one thing, the bad state of the roads has hindered the inauguration of rural services, though experiments are now being made with six-wheeler and other types of road vehicles better suited to South African conditions than the ordinary four-wheel lorry or bus.

The railways have lost a considerable amount of traffic, especially passenger traffic, and to meet the new competition, charges have had to be reduced, services improved and new facilities granted, and at least one branch line (that between Port Elizabeth and Walmer) has had to be closed. Powers to operate road services have been sought from Parliament with the object of bringing about a greater measure of co-ordination, and a scheme of railhead distribution has been worked out whereby goods traffic is concentrated at certain stations from which road services radiate over an area of from 20 to 25 miles. Through rates by road and rail are quoted to all parts of the Union to which these services extend. Experimental services, including many feeder services, are now in operation on 140 routes, covering some 7,000 miles, and a special tariff, consisting of three classes, has been arranged for these services. Tariff No. 1 applies to high value articles, No. 2 applies to general traffic, while No. 3 is applicable to commodities of low value such as fodder, grain, bagged fertilisers, etc. Rate 3 is about two-thirds of Rate 1.

In addition to the countries which have been so far considered, there are many more in which the problem of road and rail co-ordination is forcing itself to the front. Governments, especially where State railways are being severely affected, are taking steps to prevent the introduction of additional road services without some proof

being given of their necessity. In Italy, for instance, where the main railway lines are operated by the State, stringent governmental regulations have been imposed with the object of protecting the railways. Road motor services are only permitted (1) if they act as feeders to the railway, (2) where one railway station has to serve several districts, and (3) where inter-communication between towns is not provided by the railways.

In Australia, various State Governments have attempted to protect their railways by passing regulations (in some cases severe regulations) to control the operation of road transport. In South Australia, motor taxation has been increased to such an extent that the operation of a large number of bus routes has become unprofitable. The Government has decided to take over all the motor bus services after paying compensation to the proprietors limited to about £50,000, when the buses are to be operated by the Tramways Board. In New South Wales, the Government is also contemplating the taking over of buses and operating the services through the Railway Department which already controls the tramways.

In Victoria (Australia) the recent "Motor Omnibus (Country and Urban) Act" laid down very stringent regulations for the control of road transport in the interests of the railways. Bus services can only be initiated if a public need is proved, but if the route in any way competes with the railways a heavier license duty is payable. All commercial motors have been placed under the control of the Country Roads Board with the stipulation that the Board must not license motors for any route in direct competition with a railway. No compensation, however, was given to those road operators who were forced to discontinue their services and the Act has borne very heavily upon them. It is said that few licenses have been applied for, as the routes which the Board was prepared to sanction are unprofitable short routes. Various expedients have been tried to get round the Act, which is said to have been a failure, and it is probable that it will be modified in the future.

CHAPTER VIII

CO-ORDINATION BETWEEN OTHER TYPES OF TRANSPORT

THE benefits which may be gained from co-ordination are not confined to road and rail transport, though any discussion of the co-ordination problem must necessarily centre around roads and railways since they are relatively by far the most important of the means of inland communication. In certain circumstances, there is much to be said for a policy of co-ordination among all forms of inland transport and the same arguments can be applied *mutatis mutandis* in favour of the substitution of co-ordination for competition among these other forms of transit. In each case, the economic arguments rest on the elimination of unnecessary and wasteful competition and the provision of co-ordinated services which will serve to provide a better and more economical service to the community.

Air Transport Co-ordination

The rapid development of commercial aviation has brought into prominence the question of its co-ordination with the older forms of transport. With air transport some degree at least of co-ordination is essential since collections and deliveries at terminal aerodromes can only be effected by road vehicles or railways. Most aerodromes are situated some distance from the centre of the cities which they serve and thus a co-ordinated system of road or rail delivery is essential to minimise delays.

Over long distances, there are also great possibilities for co-operation with rail and steamer services and already a number of such co-ordinated services have been

introduced with advantage to all the forms of transport concerned. The earliest experiment seems to have been made in Canada, when in 1924 the Canadian Pacific Railway and the Laurentide Air Service operated in conjunction. The railway station at Angliers was connected by air with the Rouyn Goldfields and the departure and arrivals of the aeroplanes were arranged to suit the trains.

In various parts of the world, railways are now being utilised to carry passengers and mails by night in conjunction with day-time air services. In May 1928, for instance, a company known as the *Transcontinental Air Transport Inc.* was formed by various aircraft, railway and banking interests to operate combined air and rail communications from New York to Los Angeles.¹ On the recently inaugurated air service to India, the route of 5,000 miles is divided into several sections. The first part from Croydon to Basle is performed by aeroplane, then from Basle through the Alps to Genoa the journey is continued by night train; from Genoa to Alexandria by flying boat, and from Alexandria to Basra and Karachi by aeroplane.

Night flying, though quite possible and indeed extensively employed in Germany and the U.S.A., is expensive to carry out since the routes must be lighted and it is difficult and expensive to provide sleeping berths. Unless the latter are provided, however, the journey would be very tiring for passengers. On many long distance routes at the present time, the maximum advantage in regard to speed can be best obtained by the combination of day services by air and night services by rail or steamer.

In Canada, many interesting examples of rail and air co-ordination have been inaugurated. In May 1928, the Canadian Pacific Railway Company introduced a co-ordinated air service for the conveyance of mails and merchandise in connection with their trains and steamships. This air service is operated between Rimouski

¹ In the summer of 1929, two further trans-Continental air and rail services were inaugurated and the transit time between New York and Los Angeles has been reduced to 46 hours.

(where the Atlantic liners take up a pilot), Quebec, Montreal, Ottawa and Toronto.

In 1928, experiments were also carried out for the purpose of accelerating ocean mails by utilising aircraft for the first and last few hundred miles of the journey. On the outward journey this was accomplished by dropping the mails on the ships from aeroplanes, while on the inward journey, aeroplanes have been launched from the ship's deck by means of a catapult. On several voyages during 1928 the S.S. *Île de France* carried a single-engined seaplane which was catapulted from the after-deck, three or four hundred miles short of New York, thus affording a gain of about a day in the time of delivery of the mails.

The greatest progress towards the co-ordination of air and rail transport has been made in Germany, where the *Deutsche Lufthansa* has entered into an agreement with the State Railway Company for the co-operative handling of freight. By this agreement the elaborate railway organisation for the collection and delivery of goods is at the service of the air transport concern. In August 1927, an agreement was effected for the purpose of facilitating combined transport by air and rail, while for passengers combined tickets have been available since 1926 and can be obtained from travel bureaux. Somewhat similar schemes have been introduced in Switzerland and Sweden to facilitate the co-ordination of rail and air facilities. In Germany, a more recent development has been the inauguration of a combined air and rail service (the "Fleiverkehr") for the express shipment of goods. This service enables goods to be transported on one bill of lading by the fastest combined rail and air express freight service available, from and to all places in Germany served by the Lufthansa or wherever there is a railway station available with facilities for handling express traffic. The service is also capable of extension to all European countries which are members of the International Air Traffic Association.

In 1928, the four big railways in Britain introduced private legislation for the purpose of obtaining air powers.

They have stated that they do not intend to be left in the same position when air transport develops as they were when road transport competition became severe. Air powers, they maintain, would enable them to co-ordinate the various forms of transport to the greatest advantage and would enable them to enter into agreements with other air transport concerns. They fear that the un-co-ordinated development of air transport might in the future lead to a serious loss of their first-class passenger traffic and other high grade traffic in express parcels, mails and perishables.

Inland Water Transport and the Coasting Trade

In recent years, inland water transport has suffered from the competition of mechanical road transport and it would seem that much traffic has been abstracted from the waterways, especially where distances are short, despite the fact that in general road transport caters for the higher grades of traffic. On certain canals, even traffic in bricks, sand, pig-iron and road metal has been lost, owing to the flexibility of road transport which enables deliveries to be effected from door-to-door or to the actual sites where work is being carried on. The savings in transhipment and labour costs which are thus effected seem to outweigh the cheaper rates of water transport. Nevertheless, there are possibilities in the co-operation of canal and road hauliers, especially if demountable bodies or containers are utilised and if mechanical appliances are provided at the wharves. Inland water transport would undoubtedly benefit if motor lorries were utilised to provide collection and delivery services. Two of the main drawbacks of waterways transport are the slowness of travel and the rigidity of the routes. The former limitation has been responsible for the loss of traffic to the railways in the past, while the latter confines canal transport to traffic passing between places along or near the line of route. Motor vehicles now provide a means of speeding up the services by reducing terminal delays, and over

moderate distances the speed of transit may approximate to that of the railways. Mechanical road transport also provides a means of extending the area which can usefully be served. The coasting trade likewise would gain much by co-operating with road transport since the hinterland of each port could be served and in this connection it is of interest to note that almost half the population of Great Britain is concentrated near to the twelve largest ports. Co-ordination would also have the advantage of reducing congestion at the docks since as things are, each trader hauls his own freight to and from the quays, which are frequently in consequence overcrowded with vehicles and freight. Many port authorities indeed have found it necessary to restrict the number of vehicles which may enter their property.

In the United States the co-ordination of motor and shipping services through mutual arrangements is one of the most recent developments in motor transportation.¹ The *Bush Line*, which operates on the Delaware River between Philadelphia and Wilmington, has purchased a number of motor vehicles of its own and has also contracted with a motor haulage company for the provision of the required services in certain districts. Freight is picked up as required and store-door deliveries are given, while through rates by motor and river are quoted. Another important example of co-ordination is the through service provided by the *Merchants' and Miners' Transportation Company* between many towns, and for this purpose it utilises motor transport, railways or inland waterways, according to the circumstances.

¹ *Johnson, Huebner and Wilson, "Principles of Transportation,"* p. 441.

CHAPTER IX

CO-ORDINATION OF PASSENGER TRANSPORT FACILITIES IN GREAT CITIES

IN practically all the great cities of the world, a distinct tendency is manifest towards the co-ordination of the various forms of passenger transport which has as its object the elimination of wasteful and unnecessary competition. Everywhere the traffic problem has become acute in urban areas so that some measure of reform has been found necessary. It is generally agreed that the various types of urban passenger transport—buses, tramways, steam, electric and underground railways—are each essential for the provision of adequate facilities. Railways provide rapid transit facilities and cater for heavy suburban traffic. Tramways provide for the shorter distance heavy traffic, while the motor bus is becoming of increasing importance for almost every other kind of passenger traffic in cities and their environs. It is true that the Bus versus Tramway controversy has not yet been definitely settled, but during the past few years there has been a tendency to recognise that there is still scope for the modernised tramway where a sufficiently heavy traffic is available.

In many cities severe competition has been rife between buses, trams and local railways, and as a result of this competition, the financial position of the various systems has often become so precarious that it has not been possible to develop travelling facilities, adequate to the needs of the public. Moreover, unrestricted competition has led to severe traffic congestion which slows down the rate of movement on the streets so that in some parts it may even be quicker to walk than to take a bus or tram. At the same time as traffic congestion has become almost intolerable in the central part of the cities, the outer parts

have been suffering from a shortage of transport facilities. If the best system of city transport is to be evolved, the problem must be regarded as a whole. Thus in London the extension of the underground railways is an urgent necessity but such extensions are unlikely to be remunerative if unrestricted surface competition is permitted. The extension of underground railways or tramways necessitates the sinking of a large amount of capital which cannot be expected to yield a return except over a long period. This capital, however, is at the mercy of motor bus concerns which are not tied to fixed routes and may move their vehicles elsewhere if traffic declines. Such motor bus competition may attract sufficient traffic to justify a service of a few vehicles an hour, but the loss of this small margin of traffic may mean a great difference to concerns operating with a large fixed capital which requires heavy traffic if it is to be remunerative. Hence, without some form of co-ordination, it is unlikely that extensions to rapid transit facilities will be built. Again, as Lord Ashfield has stated, "Transport in an urban community is not static but dynamic." Routes, which if viewed in isolation would be unremunerative, can be worked successfully where facilities are co-ordinated since then the various links in the chain of city transport can be provided on a systematic plan. A progressive policy is essential to meet the ever increasing demands for better urban transport, but it may not be possible to inaugurate development services in new housing areas and in the outer suburbs when severe competition prevails on the better paying routes. Such extensions cannot be expected to pay their way for some years and have at first to be subsidised from the better paying routes.

Passenger traffic co-ordination in Greater Paris.—The development of passenger transport facilities in Greater Paris presents certain peculiarities which have intensified the problem of providing adequate services. Until July 1928, when the Department of the Seine authorised the extension of the underground railway beyond the walls of the city, the rapid transit facilities were confined to

an area within the ramparts. The curious anomaly had, therefore arisen, that short-haul transport was the province of the underground railways, while long-distance traffic was catered for by the tramways. Another important improvement has also been effected in recent years by the electrification of the old steam suburban railways which had been forced to adopt the unique expedient of providing double-deck coaches to carry their heavy traffic.

Paris has the distinction of being one of the first of the great cities of the world to adopt a policy of co-ordination. Immediately after the War, it became apparent that competition between the tramways and motor buses was sufficiently severe to make the extension of the services to the new housing areas an unattractive proposition and it was, therefore, decided in 1921, to authorise the formation of a single undertaking (the Société de transport en commun de la région Parisienne) to which the administration and operation of the trams, buses and boats were handed over on lease for a period of 30 years. Some measure of public control has also been set up over the surface transport systems and the underground railways in the form of a large committee representative of the various interests involved, so that in effect a very considerable degree of co-ordination of the various services has been effected.

Transport co-ordination in Berlin.—Towards the end of 1928, the tramways, buses and overhead and underground railways of Greater Berlin were amalgamated under a single management, known as the Berlin Traffic Company. The local lines of the State Railway were excluded but the importance of the merger is attested by the fact that the constituent systems carried 1,205,100,000 passengers in 1927.

Before this measure of co-ordination was introduced, the transport facilities of Berlin were in a somewhat chaotic condition, owing to a great increase in street transport. Extensions of the underground system and the electrification of the local railways had become urgently necessary to relieve congestion. The recent amalgamation, however, was only effected after many vicissitudes and the three

constituent parties to the agreement have themselves been built up as the result of a process of amalgamation which has been going on since 1912, when the unification of the tramway system was commenced. In 1914, the underground railway and the tramways each acquired one-third of the shares of an omnibus company which had begun to compete with them, and in this manner they obtained control of the bus system including the issue of concessions for new services. After the War, the process of unification was hastened by the difficulties of the period and especially by the collapse of the currency. The City authorities in 1920, bought out the tramway system at a very low figure. It was found, however, that the conflicting aims of political parties tended to affect adversely the operation of the system, and in 1923, the operation of the tramways was transferred to a company, though ownership was retained by the City.

In 1926, the underground and elevated railway also came under the control of the City, being bought out at a bargain price. The City also possessed the majority of the shares of the Berlin Omnibus Company, as the result of the absorption of the tramways and the underground railway. For a time the Corporation was content to operate the systems through their respective companies, subject to the control of a governing Commission consisting of 16 members, of whom 8 were elected from the Board of Aldermen, 4 were representatives of the city administration, 2 were prominent citizens and 2 were employees of the operating concerns.

Several attempts were made to establish uniform fares, but this was not achieved till March 1927, when a uniform 20 pfennig fare was inaugurated for all three forms of transport. In 1928, this was extended to the internal urban lines of the State Railway Company with complete through booking facilities. Transfer tickets were also issued and the innovations proved so popular that a continuous increase in traffic has taken place. In 1926, some 1,450 million passengers were carried by the various systems, but in 1927 the number increased to some 1,564 millions, and in 1928, to 1,800 millions.

Complete co-ordination was not effected by the three companies operating under the management of their respective boards and so in November 1928, the Municipal Council decided to establish a single company to operate the trams, motor buses and the elevated and underground railways. The scheme provided for the dissolution and liquidation of the three companies and for the inauguration of a single combined transport company with a capital of R.M.400 millions. The shareholders in the old companies received municipal bonds to an amount rather more than the market value of their securities. The new company thus became the owner of all the plant and equipment though actually financed by the city. The form of the amalgamation was influenced by legal and financial considerations, as a simple fusion of the existing companies would have left a number of private shareholders on the books and the new company would have had to pay the stamp duty on formation, and annual corporation and property taxes amounting in all to more than 5 million marks. Exemption from these taxes and the stamp duty was obtained since the share capital of the company was entirely owned by the municipality.

A management board consisting of 5 members has been set up, including a director from each of three transport departments, a representative of the municipality and another from the electricity department. This board works under the general control of a commission consisting of 12 members, which commission is in effect a continuation of the former commission of 16 members which had been entrusted with the control of the three separate companies.

The amalgamation, it is expected, will lead to economies in administration, though time is required before these savings can be effected to the full. Wasteful overlapping is being eliminated and the various systems are being co-ordinated so that the most suitable method may be used to provide facilities whenever a demand for new services arises. It is now possible to construct new underground railways for which, as in London, there is great need. As the result of co-ordination, the necessary

capital can be provided without fear that undue surface competition will make the expenditure unprofitable. These new underground railways should do much to relieve the traffic congestion on the streets.

Some statistics may be of interest as showing the importance of the scheme of unification. Berlin has a population of well over 4 millions and in 1926, the inhabitants on the average took 353 rides per head of the population, which compares with 414 journeys per head of the population in London in the same year.

TABLE XXII

		1913	1927	1928
		Millions	Millions	Millions
Tramways	652	825·9	900
Elevated and Underground Railways	73	222·5	265
Motor buses	170	156·7	222
State Railways (local lines)	...	395	358·9	413
Total, all systems	...	1,290	1,564	1,800

TABLE XXIII

Berlin Transport Undertakings. Traffic Statistics, 1927.					
	Length of system	Persons employed	Vehicle miles	Passenger miles	Traffic Receipts in million Reichsmarks
Tramways	miles 384	14,102	millions 99·8	millions 2,634	115·9
Elevated and Underground Railways	35·1	6,408	26·1	765	32·5
Motor buses	194	4,165	18·2	490	28·3
Total	613·1	24,675	144·1	3,889	176·7
State Railways (local lines)	316	—	166·1	26·1	64·7

Co-ordination in Vienna.—Some degree of co-ordination between the municipal tramways and the local railways was effected in Vienna in 1924, when the Stadtbahn was leased from the State Railway. Before it was taken over, the Stadtbahn, which is some 16·4 route miles in length, was worked as a steam railway, carrying no more than 40 million passengers per year. After being absorbed by the City, it was electrified and operated in co-ordination with the municipal tramways, and as a result of these improvements the number of passengers carried increased to more than 100 millions a year. A system of transfer tickets was adopted and it has been found that by far the great majority of the passengers utilise transfers to and from the tramways.

Co-ordination in American Cities.—In the United States there have as yet been few attempts to introduce a greater degree of co-ordination, though it is generally agreed that in many cities conditions are so bad that some measure of co-ordination will have to be introduced in the near future. In the New World, traffic congestion is greatly intensified by the immense number of private cars and taxi-cabs which use the streets, and thus co-ordination by itself cannot be expected to solve the problem of congestion.

In New York and Chicago, it is said that negotiations are being carried through to secure the unification of the various public passenger transport agencies under private management. In Philadelphia, co-ordination has been secured for several years under private control by the *Mitten Management Inc.*, and in 1927, even the taxi-cab services were brought into the scheme. This Company has been a keen advocate of employee and consumer ownership of their share capital, so that as far as possible divergent interests might be assimilated.

A survey of the great cities of the world shows that the traffic problem has everywhere become acute and that the general direction of all the varied schemes, devised to secure the better working of the facilities available and to provide additional facilities as required, has been towards some system of co-ordination.

Unification, amalgamation, or the introduction of some form of co-operation has been found essential, though to safeguard the interests of the passengers some measure of public control has generally been introduced. In certain cities, co-ordination has been achieved through private ownership, though in others, municipal ownership has been favoured. In the latter case ownership has remained vested in the cities, but operation has generally been entrusted to a Commission or Company rather than placed under the direct management of municipal officials. This method is one which has become popular in other spheres such as the operation of State Railways, *e.g.*, the Canadian National Railway.

The Passenger Transport Problem in London

For many years, the transport problem of London has been acute owing to the serious difficulties in the way of providing adequate passenger transit facilities. In the first place there is the extraordinary magnitude of the problem. The population of greater London, which covers an area of 699 square miles, exceeds $7\frac{3}{4}$ millions, and over 3 million passengers per day demand transport facilities within that area. One of the most remarkable features of the development of London's transport demands has been the very marked increase year by year in the number of passengers which has to be carried. In 1903, the number of passengers carried by public vehicles, within a radius of 25 miles of Charing Cross, was 972 millions, but by 1925 the number had increased to 3,252 millions.

TABLE XXIV

Number of passengers carried
within a radius of 25 miles of
Charing Cross.

1903	972 millions
1914	2,065 "
1920	2,800 "
1925	3,252 "

As regards the distribution of traffic among the various types of transport, the tramways, until 1922, carried the largest number of passengers in Greater London, but since that year the premier place has been taken by the motor buses.

TABLE XXV

Number of passengers carried annually in Greater London.¹

Year	Local Railways ²	Buses	Tramways	Total
	Millions	Millions	Millions	Millions
1901	237	270	341	848
1911	474	400	822	1,696
1921	615	932	1,009	2,559
1927	601	1,822	1,010	3,433

The growing importance of the motor bus in London transport is reflected in the statistics of the number of such vehicles engaged in the Greater London area.

TABLE XXVI

Number of vehicles employed in Greater London.

	1923	1924	1925	1926
Buses	4,482	5,033	5,204	5,013
Tramcars	2,969	2,814	2,803	2,757
Local Railway Cars ...	1,955	2,180	2,205	2,390

It is true that the seating capacity of the local railway coaches and the tramcars is greater than that of the buses ; but this fact does not vitiate the comparison of the greater relative increase in the number of buses since there has

¹ Figures taken from *J. P. Thomas* "Handling London's Underground Traffic," as are those in Tables XXVI and XXVII.

² N.B.—Suburban traffic of main line railways is excluded.

not been much, if any, alteration in the number of seats available per railway coach or per tram.

Figures relating to the growth in the annual number of journeys per head of the population of Greater London show a very marked increase since the War and they demonstrate the well known fact that the demand for transport in modern times is cumulative.

TABLE XXVII

Average number of annual journeys per head of the population of Greater London.

Year	Local Railways ¹	Buses	Tramways	Total
1919	95	117	143	355
1920	97	125	143	365
1921	82	125	135	342
1922	79	131	137	347
1923	76	162	136	374
1924	74	193	127	394
1925	76	215	126	417
1926 ²	70	219	125	414
1927	75	231	128	434

In this table also, the most marked feature has been the great increase in the popularity of the motor bus, whereas journeys per head on the trams and railways have actually decreased.

Mr. Frank Pick, in a paper on "Growth and Form in Modern Cities," read before the Institute of Transport, has given some interesting figures relating to journeys per head of the population in certain great cities of the world. London is only second to New York in the number of journeys made by each inhabitant per year.

¹ Excludes main line suburban traffic.

² Year of General Strike.

TABLE XXVIII

Average number of rides per Capita in the big cities of the World during 1925.

New York	...	545	Birmingham	...	312
London	...	503	Vienna ¹	...	309
Paris	...	411	Liverpool	...	308
Chicago	...	373	Detroit	...	305
Berlin	...	365	Boston	...	304
St. Louis	...	361	Glasgow	...	299
Philadelphia	...	333	Cleveland	...	295
Edinburgh	...	330	Leeds	...	274
Manchester	...	328	Bradford	...	267
Hamburg	...	323			

Besides the magnitude of the transport problem in London, there is also another feature marking it off from the similar problems of many other cities. London has not been planned and has merely grown up, stretching out from year to year and absorbing the outlying districts, towns and villages.

"The problem of streets and street capacity is rapidly becoming the most acute of all civic problems. At the moment in London, palliatives of all sorts are being explored to ensure that the present streets shall be employed to their utmost capacity to carry the immediate growth of traffic. There are roundabouts, one way streets, alternative routes by side or bye-streets, lamp and white line controls, stops to be allowed and not to be allowed, regulations for the good conduct of travellers in an unceasing stream. Yet all are palliatives and will ultimately fail dangerously in proportion to their immediate success. . . . Fewer and better streets are needed. As the City grows greater the small buildings and the small streets should both disappear."²

The need for the co-ordination of transport facilities has probably been greater in London than in any other city, yet in no other has the problem been more difficult to solve. There is an excessive number of vehicles competing for traffic on the streets. Unlimited competition

¹ For Year 1924.

² F. Pick, "Growth and Form in Modern Cities." Journal Institute of Transport, Vol. 8, Part 4, p. 169.

on the surface has prevented the extension of the underground railways since there is no secure basis for new capital investments. Tramways also suffer from intensive competition and there is a prospect that some of the tramways may have to cease operation. In his evidence before the Royal Commission on Transport, Sir Henry Maybury has stated that in the East End at the "rush hours," the streets hold all the transport that could be put into them and there is enormous overcrowding. Intensive competition leads to congestion and thus slows down the speed of the buses, causing delay to passengers and increasing operating expenses.

The London traffic problem is no new problem, as it has been a prominent question for a hundred years or more. It has, however, become more pressing during the last few years. From time to time many Government committees and commissions have reported on the problem and a whole volume could be filled by a description of the various suggestions which have been made for the solution of the problem. To go no further back than 1903, the Royal Commission on London Traffic considered the main difficulty of improving transport facilities was due to the narrowness of the streets and the lack of any plan in their lay out. The present streets of London are frequently the survivals of village roads and lanes, developed into city highways under the care of small independent local authorities. Even as late as 1855, the Strand between Northumberland House and Temple Bar, a distance of little more than three-quarters of a mile, was divided for maintenance purposes into seven different parts, each under the charge of separate paving boards.

The Royal Commission of 1903 held that the unsatisfactory conditions of London's transport was largely due to the fact that there did not exist in the past any municipal or other authority having control over the whole area. They recommended that a comprehensive plan for transport improvement should be drawn up, and that a Traffic Board with jurisdiction over Greater London should be set up.

Since the Royal Commission reported in 1905 and 1906, numerous committees have considered the problem of London traffic, including the "Select Committee on Transport in the Metropolitan Area" (1913)¹; the Committee on "Transport (Metropolitan Area)" (1919)²; the "Advisory Committee on London Traffic" (1920)³; and the Royal Commission on London Government.⁴

In the reports of all these committees and commissions, there was a practically unanimous agreement as to the necessity of setting up some form of controlling body. In discussions between the Ministry of Transport, the L.C.C. and the Combine, the desirability of establishing some such authority was also agreed upon.

But, though on all hands it was admitted that some supreme authority was required and that the co-ordinated operation of the various local passenger services in London and adjacent districts was essential, there was no unanimity as to the powers which ought to be granted to such an authority or as to its constitution. Some advocated a small body of paid experts, who would be attached to the Ministry of Transport; others favoured a larger body, consisting of representatives of the various local authorities concerned and other interested parties; some advocated compulsory powers for the committee; others held that it should be merely advisory. In 1919, an advisory committee was formed, consisting of representatives of the "Underground," the L.C.C. Tramways, the Police and the Transport Workers' Union, but as it had no definite standing and no powers, it was not able to accomplish any measure of co-ordination.

The London Traffic Act 1924.—In 1922 an important memorandum was submitted by Sir Henry Maybury, the Director-General of Roads to the Royal Commission on London Government. He recommended the appointment of a Traffic Committee which would advise and assist the Minister of Transport on all matters connected with London Traffic. This Committee, it was suggested, should consist of not less than 11 nor more than 15 members

¹ H.C. 278.

² 147.

³ C.M.D. 636.

⁴ C.M.D. 1830.

representing the Minister of Transport, the L.C.C., the Metropolitan Boroughs, various County Councils, Labour, the "Combine," Railways, Users of Horse and Motor Transport, etc. The area to be regulated was to be that within a 25 mile radius of Charing Cross, and among the duties of the Committee were included the co-ordination of all passenger transport agencies, the preparation of a development plan for London traffic, control of town planning and housing schemes from a traffic point of view, traffic regulation, etc.

In March 1924, as a result of a tramway strike, a Bill was introduced in the House of Commons with the object of setting up some supreme traffic authority, on the lines suggested in Sir Henry Maybury's memorandum and the Report of the Commission on London Government. By the subsequent London Traffic Act of 1924, the London and Home Counties Traffic Advisory Committee was set up to assist the Minister of Transport to carry out the provisions of the statute. The aim of the Act was in the first place to relieve tramways from excessive competition so that they might meet the demand for higher wages. The Committee itself has no compulsory powers and its duties are confined to the consideration and report to the Minister of Transport of any matters within the scope of the Act, *e.g.*, the limitation of the number of buses on certain routes, the closing of streets for repair or public works, transport facilities available in certain districts.

Previous to the setting up of the London Traffic Advisory Committee, some of the enterprises engaged in providing London's transport had worked out a certain measure of co-ordination between themselves and as the principle which they adopted has been made the basis of later discussions, it is necessary to describe this voluntary, though partial scheme of co-ordination, before proceeding further. By the London Electric Railway Companies Facilities Act of 1915, the various parties to that Act—the Metropolitan District Railway Company, the London Electric Railway Company, the City and South-London Railway Company, the Central London Railway Company

and the London General Omnibus Company—were authorised to make agreements whereby each of these companies would transfer the balance of their revenues to a "Common Fund," after paying all working expenses, meeting interest charges on prior securities and providing the requisite sum for reserve. The first claim upon the Common Fund is that of a company which cannot meet all its prior charges in full. Any deficit on prior charges is thus made good out of the pooled revenues of the remaining companies. Only after all prior charges have been met, can any dividend be paid on the ordinary shares of the various companies. The scheme has now been working for some time and it has proved of great benefit to the constituent concerns, though they assert that it is too limited to obtain the maximum advantage. They would, therefore welcome its extension to other transport concerns in London. It is claimed for the Common Fund that it has benefited not only the constituent companies and their employees but also the travelling public, since extensions and improvements have been made possible which could not have been undertaken without the security afforded by the Common Fund.

The first step taken by the London Traffic Advisory Committee was to secure the restriction of the number of buses on certain routes and of the streets through which they might be run. In this way a partial relief was obtained from undue congestion prevalent in certain streets. The Committee also held public enquiries into the state of traffic and transport facilities in the North, North-East, East, and South-East of London. In their reports, subsequent to these enquiries, the Committee expressed the opinion that the only satisfactory and lasting solution of the whole problem of passenger transport in London appeared to lie in the adoption of unified management, subject to public control. They held that experience showed that the powers conferred on the Minister of Transport by the London Traffic Act of 1924, were inadequate as a means of eliminating wasteful competition. They also stated that the provision of improved facilities

depended partly on the conversion of steam to electric railways and even more, on the further development of the underground system. Lord Ashfield, acting for the L.G.O.C. and the Underground interests at the enquiries, stated that until wasteful competition was eliminated on the streets, it would be impossible to build new "Tube" railways. The Committee itself has declared that :

"No lasting solution of the London passenger transport problem can be secured as long as the present competitive methods are pursued. . . . The unified management of the underground and other local railways, tramways and omnibuses would provide the only permanent solution of the whole problem."

The Advisory Committee's Report.—In 1927, therefore, the Advisory Committee brought forward a scheme, originally drafted by the Underground Group, for the establishment of a common fund and common management for the various undertakings (excluding the suburban lines of the main line railways), operating solely or partially in the London Traffic Area. They recommended that the various concerns should remain the property of their present owners but that an over-ruling public authority, standing outside the ownership or management of any of the undertakings should be set up. Its duties would be to act as a judicial body in regard to complaints or disputes between the parties to the Common Management and it would also be empowered to determine fares,¹ secure adequate services and to review the existing transport facilities and the need for new developments. They suggested that the Traffic Advisory Committee might itself act in this capacity and that if adopted the scheme should remain in operation for 42 years. No disturbance in the ownership of the existing concerns was contemplated though exception might be made in the case of small bus undertakings.

In the report of the Committee,² it was argued that the

¹ It is, on the whole, better to limit fares than profits, since limitation of the latter might encourage inefficiency.

² This report is frequently referred to as the Blue Report.

scheme would promote the co-ordinated working of all the existing forms of passenger transport in London and would enable each to perform the services for which it was best suited, while the public, through the elimination of wasteful and uneconomic competition, would be given a more efficient service. It was implied that there was sufficient traffic in London to provide a satisfactory return on the large amount of capital invested in the transport undertakings and to allow developments to be undertaken. The Committee felt that if the proposals were accepted, the transport concerns would become self-supporting, without any increase in fares.

The Common Fund constitutes the basis of the scheme. This fund, following the principles adopted by the Combine, would be formed out of the balance of the gross revenues of the several undertakings after they had met their respective revenue liabilities including working expenses, depreciation, renewal, rents, interest on loans, debentures, guaranteed and preference stock and other prior charges. Special arrangements were suggested for municipal loans which are not on the same footing as the other prior charges, since the question of repayment of loans or redemption of capital is involved. As regards the distribution of the Common Fund, it was suggested that a Standard Year should be taken as a basis. After all deficiencies in prior charges had been made good, the Fund would be allocated *pro rata* until the results of the Standard Year were exceeded, when the surplus would be distributed to make up the dividends of all undertakings to the same percentage return. Any surplus remaining would go towards (1) the provision of credit to attract new capital, (2) the improvement and extension of the services, (3) the reduction of fares, (4) a general reserve and (5) the temporary financing of new undertakings.

After the issue of the Report, conferences were arranged between the Advisory Committee, the transport undertakings, representatives of labour organisations and the Minister of Transport. With the exception of a minority of bus owners, there was general agreement on the principles

set out in the Report. The main line railways, however, held that they should be included, when and if the scheme was adopted. Exception had been made in the case of their suburban systems because of the complication of accounts and operating, but permissive powers were suggested to enable the railways to enter into agreements or pooling arrangements. It is obvious that the railways might suffer if they are not included, and to provide complete co-ordination, it is essential that the railways should be parties to the scheme, carrying as they do some 17.5 per cent. of the passenger traffic in Greater London.¹ Discussions, therefore, took place between a sub-committee of the Advisory Committee and representatives of the main line companies. The railway companies maintain that they are a dominant factor in London traffic and that the co-ordination scheme would result in a monopoly of road transport in the London area, which if continued would prevent the railways undertaking improvements or additions to their rail transport facilities.² Official approval should not be given, they contend, to any scheme which does not provide for the co-ordination of *all* passenger facilities in the area. They are favourable, however, to the principle of co-ordination provided that it means co-ordination of *both* road and rail transport, particularly in the area outside the Metropolitan Police boundary. Sir Josiah Stamp, in his evidence before the Royal Commission on Transport, said that it would be difficult to secure co-ordination of passenger transport facilities under the scheme proposed by the Advisory Committee, since those undertakings having the largest prior charges would be put in a better position at the expense of other undertakings with smaller prior charges and that the ordinary shares of the latter undertakings would suffer in consequence. In some cases, he agreed that a pool of net receipts from road-rail transport might prove feasible.

The suggestion has been made that a council consisting

¹ If passenger-miles were taken as the basis of comparison, the proportion would of course be higher as rail journeys on the average are longer.

² The railway companies are excluded by their Road Powers Acts from carrying passengers by road *within* the London area.

of representatives of the bus, tram, underground and railway interests might be set up which would be subject as regards questions of general policy to the Public Statutory Authority. The Common Fund—which the railway representatives were prepared to accept in principle—it has been suggested, might be extended by pooling gross receipts from railway passengers whose journeys originate and terminate in the London Traffic area, after deducting therefrom an agreed allowance for working expenses. The net receipts so pooled could be divided among the parties in proportions agreed upon by them.

Negotiations between the railway companies and the committee were suspended for a time in 1928, since the railways were engaged at the time on their own transport Bills for extended road powers, but the discussions were afterwards resumed.

At the end of the summer of 1928, it became clear that the Government would not be able to find time for a public Bill, so the L.C.C. on the one hand and the Underground and L.G.O.C. group (which incidentally controls certain tramways such as the L.U.T.) on the other, united to promote private legislation whereby a partial scheme of co-ordination between the L.C.C. tramways, the "Tubes" and the L.G.O.C. buses would be effected. The two parties to the Bills had previously considered the possibility of voluntary co-ordination, but they had been informed that they lacked legal powers to do so. The Bills, which were promoted without reference to the Minister of Transport, were permissive in character and would empower the parties to enter into agreements with each other and with any outside transport owner in the London Traffic Area for the co-ordination of traffic and for the establishment of a common fund and a common management. The undertakings would remain in the hands of their present owners, and any agreement reached must be submitted to both Houses of Parliament for approval. Local authorities would have the right to appeal to the Minister of Transport in regard to any alteration in the general scheme of fares, the withdrawal of services

and the order and priority of extensions. An enquiry could be held after any such appeal, and if the Minister was satisfied that the local authority has made good its case he might exercise a veto. The Bills differed from the scheme proposed by the Advisory Committee, since in the "Blue Report" it was recommended that all passenger transport concerns in the Greater London area would be co-ordinated, and provisions were made for the setting up of a Statutory Authority to control the undertakings in the public interest. Though the parties concerned in the Bills carry about 75 per cent. of London traffic, complete co-ordination would not of course be effected unless the other traffic organisations, including the local lines of the railways, came into the agreement.

The London Traffic Advisory Committee, reporting on the Bills, considered the question as to whether it was worth while to permit of this partial co-ordination as a temporary measure without the safeguards or control of a Statutory Authority which could not be established by private legislation. They concluded that the Bills could be justified because of the urgent need for co-ordination and because the parties concerned carried such a large proportion of London traffic. They held that the Bills would facilitate the provision of through travelling facilities and would not hinder the setting up of the more comprehensive scheme when a suitable opportunity arose.

The Bills were strongly opposed by the Labour Members both in the London County Council and in Parliament, as in their opinion it was the duty of the Government to promote immediate legislation to give effect to the co-ordination and public control of London traffic. They were of the opinion also that "Nationalisation" is the only effective remedy for the traffic problem. Though passing their first and second readings, the Bills were ultimately rejected at the third reading owing to a change in government.

At the present time the indications are that some form of co-ordination will have to be adopted not only in London but also in many other large cities. If the various

transport industries cannot introduce a system of co-ordination by themselves, then the task will have to be undertaken by an outside body, as the demand for co-ordination is even more urgent in city transport than over larger areas. Complete co-ordination, whether voluntary or compulsory, is likely to lead to a demand for a public controlling body which would safeguard the interests of the public. Such co-ordinated systems subject to public control, it is hardly necessary to remark, should be formed on the basis of regional traffic areas rather than on administrative areas.

INDEX

Acworth, Sir W. M., 21n.
 Agriculture and road transport, 35, 85, 95-97
 Air mails, 43, 44, 113, 114
 — transport, 20, 24, 41-46, 78, 112-115
 Aire and Calder Navigation, 37
 Airships, 41n., 43
 Appeals, licence, 79, 80
 Ashfield, Lord, 118, 132
 Australia, 42, 58, 111
 Balfour Committee, 40
 Baltimore and Ohio Railroad, 104
 Baltimore, Chesapeake and Atlantic Railway, 104
 Belfast, 81, 109
 Belfast and County Down Railway, 29
 Bell, R., 57
 Berlin, transport in, 119-123
 "Blue Report," 132-133, 136
 Boston and Maine Railroad, 103
 Braked goods trains, 19, 20, 57
 Branch lines, 29, 51-52, 75, 103
 Bridges, 65, 88-89
 Browne, J. H. Balfour, 86
 Brunner, C. T., 65n.
 Burtt, P., 25n.
 Bus stations, 99-100
 Canada, 58, 113-114
 Canals, 21, 36-39
 Catapult air mails, 114
 Certificate of Public Convenience, 102, 106
 Chamberlain, W., 80n., 108
 Chicago, 123
 Circuitous rail routes, 29, 56, 75
 Clark, J. M., 22
 Classifications, 21, 28, 64, 105
 Clayton rail coaches, 28
 Coal traffic on railways, 49-50
 Coasting steamers, 20, 21, 39-40, 116
 Collection and delivery services, 69, 85, 95-97
 Combination among bus companies, 54-55

Common carriers, 34, 38, 64, 106
 "Common Fund," 131, 133, 135
 Common management, 72, 77, 132
 Competition, advantages of, 65, 68, 83
 — road and rail, 48-66, 70
 — in United States, 58-60
 — wasteful, 67, 68
 Congestion, street, 78, 117, 119, 123, 127-128, 131
 Conroy, J. C., 29n.
 Consumer ownership, 123
 Containers, 98-99, 105-106
 Co-ordination, air transport, 112-115
 — city transport, 117-138
 — difficulties of, 70-71
 — goods traffic, 94-99
 — railway, 74-76
 — Statutory, 76-78
 — types, 71-74
 — voluntary, 74
 Costs, air transport, 46
 — capital, 20-22, 24, 25-26, 27, 28, 70-71, 118
 — motor transport, 32
 — overhead, 20-23, 26, 61, 70-71
 — reduction of, 15, 103
 Crossville Motor Co., 91
 Decreasing costs, 20, 22, 23, 26, 61
 Delivery at sites, 97
 Demand for improved transport, 16-18
 De-rating, 50-51, 66
 Door-to-door services, 27, 98, 99
 Economic conjuncture, 67
 — progress, 15, 69-70
 Edinburgh, 27n., 81-82
 Electric battery vehicles, 31-32
 Electrification, 24-25, 119, 123
 Empire air routes, 43
 Equilibrium, economic, 65-66, 69
 Exceptional rates, 21, 40, 48
 Fare reductions, 21-22, 53-54
 Fares, road transport, 20, 33-34, 54, 60

Farm services, 85, 95
 " Feeder " services, 76, 85, 94, 94n., 95, 101
 Fish traffic, 20, 56, 57
 Fixed capital, 15, 26, 27, 61, 70-71
 " Fleiverkehr," 114
 Flexibility of motor transport, 27, 29, 98, 115
 France, 43, 58, 109, 118-119
 Freight exchanges, 23
 Fructification of capital, 62

Germany, 24, 43, 46, 58, 71, 71n., 73n., 109, 114, 119-123
 Goods train time tables, 20
 Grand Union canal, 38-39
 Greenock and Port Glasgow Tram-way, 80
 G.W.R. road services, 29, 75, 85, 89, 90, 91, 94-95

Halifax, 92, 93
 Haul, average, 61
 — length of, 31-33
 Hebble Bus Services, 93
 Hire purchase, 28
 Holland, 28, 58
 Horse transport, 31, 57, 85
 Housing and road transport, 56
 Huebner, G. G., 17n., 35n., 107n., 116n.

Imperial Airways, Ltd., 46, 78
 Inland water transport, 20, 23, 36-39, 115-116
 Institute of Transport, 17, 17n., 42n., 73n.
 Insurance, 36, 45, 106
 Interchangeable tickets, 91, 120
 Inventions, effect of, 16, 47
 Ireland, 58, 99n., 107-109
 Italy, 25, 111

Jarvis, Sir John, 92
 Johnson, E. R., 17n., 35n., 107n., 116n.
 Joint Committees, 73

K.L.M., 46
 K. Tariff, 109

Lamb, D. R., 72
 L.C.L. traffic, 58, 101, 105
 Legal obligations on railways, 64-65, 87-89
 Leith Docks, 20
 Licences, 78-80, 106, 108-109
 Light railways, 51-52

Line capacity, 22n.
 L.M.S.R. branch lines, 51
 — passenger receipts, 55
 — railheads, 97-98
 — road transport, 87, 90, 91, 92, 93, 97, 98
 L.N.E.R. branch lines, 51
 — containers, 99n.
 — road transport, 90, 91, 92, 93, 95-97
 — suburban services, 24
 Local authorities, 78, 80, 135
 London traffic, 124-137
 — — Act, 129-130
 — — Advisory Committee, 77, 130, 131, 132, 136
 Loss of Capital, 27, 70
 Lufthansa, 24, 43, 114

Mails, 20. *See also* Air mails
 Marshall, A., 47
 Maybury, Sir Henry, 128, 129
 Milk tankers, 62
 — traffic, 57
 Mineral traffic, 20, 49
 Minister of Transport, 39, 79, 80, 88, 129, 130, 131, 135
 Ministry of Transport, 52, 83, 87, 129
 Mitten Management, 123
 " Modern Transport," 59n., 72, 103n.
 Monkey boats, 38
 Monopoly, 21, 55, 72, 76, 82-84, 134
 Motor bus, 20, 24, 27, 29, 54, 59-60, 81
 — Transport, 27-35. *See also* Road transport
 — vehicles, number of, 30-31, 58
 Municipal transport, 73, 78, 81, 88, 90, 120-121, 123

National Omnibus and Transport Co., 75, 90, 91-92
 Nationalisation, 73, 136
 Navigations, 36-39
 New South Wales, 111
 New York, 25, 113, 123
 New York Central Railway, 105
 New Zealand, 58
 Newspaper traffic, 20, 45, 56, 57
 Night flying, 46, 113
 — travel by bus, 54, 59
 Northern Ireland, 108-109
 Nottingham and Derbyshire Tramways, 81

Operating Economies, 62, 75-76, 103, 105
 Optimum economic size, 67
 Overhead costs, 20-23, 26, 61, 70-71
 Owners' risk rates, 28

Packing costs, 28, 45
 Parcels traffic, 56-57
 Paris, transport in, 118-119
 Parking places, 65, 100
 Passenger Duty, 63, 66
 — journeys, 53, 55
 — receipts, 55, 66
 — traffic, 52-56
 — train miles, 53
 Pennsylvania Public Service Commission, 102
 Perth tramways, 81
 Petrol, price of, 31
 — rail cars, 28, 29, 103
 — tax, 31, 63
 — traffic, 57-58, 99n.
 Philadelphia, 123
 Pick, Frank, 126, 127n.
 "Pick up" goods trains, 76
 Pilferage, 28, 45
 "Plying for hire," 78
 Ponsonby, G., 56
 Post Office, 23, 73, 109
 Private cars, 51
 — fleets, 28, 51
 Protection against competition, 80-82
 Public control, 72
 — safety, 19
 Purchase of empty seats, 81, 109

Quality of service, 99
 Quasi-legal co-ordination, 72

Radial road services, 97
 Rail coaches, 28-29, 103
 — transport, advantages of, 19-20, 23-24
 Railhead deliveries, 97-98
 Railway capital, 20-23
 — Rates Tribunal, 40, 48, 83
 Railways and air transport, 78, 113, 114-115
 — regulation of, 77, 84
 — Act, 48, 62, 72n., 86
 — Act (Ireland), 107
 — (Road Transport) Acts, 55, 87-89
 — (Road Motor Services) Act, 108
 Ramsbottom, 79-80
 Ransome, S. R., 56
 "Rate cutting," 16, 89

Rates and fares, road transport, 33-34, 95-96
 — local, 63
 Regent's Canal, 38
 Regional areas, 77, 82
 Return loads, 32
 Road costs, 63
 — Fund, 65
 — maintenance, tramways, 26
 — metal traffic, 57
 Road-rail agreements, 89-94
 Road transport, advantages, 27-30, 34-35
 — clearing houses, 23
 — costs, 32
 — and coasting trade, 40
 — and economic development, 34-35
 — growth of, 30-31
 — regulation, 64-65, 102, 106-107
 — sphere, 31-33
 — taxation, 63, 65
 "Road vans," 76
 Royal Commission on canals, 38
 — on London Traffic, 128
 — on London Government, 129
 — on Transport, 71, 79, 108, 128, 129, 134
 Rubber shortage in Germany, 71n.
 Ruhr, 49
 Rural road services, 95-97

"Safety first," 67
 Saturated railway lines, 75
 Season tickets, 51, 53
 Seasonal activity, 75
 — services, 88
 Sentinel-Cammell rail coaches, 28
 Sheffield agreement, 90
 Sherrington, C. E. R., 21n., 25n.
 Shipping, coastwise, 39-40
 Small enterprises, 77
 South Africa, 58, 110
 South Wales Commercial Motors, Ltd., 91
 Southern National Omnibus Co., 92
 Southern Railway, electrification, 25
 — road services, 91-92, 97
 Southwold Railway, 51
 Stamp, Sir Josiah, 17, 134
 Stances, 65
 Standard Revenue, 48, 62
 State control, 72, 77
 — railways, 110-111
 Static periods, 69

Stations, bus, 65
 Statutory co-ordination, 76-78
 — undertakings, 79
 Steam tugs on canals, 37
 Steamship services, 105, 113-114
 " Store-door " delivery, 101
 Subsidies, air transport, 46
 Substitution, Principle of, 47
 Suburban railways, 24-25
 Sweden, 42, 114
 Switzerland, 114
 Tapering rates, 34
 Taxi-cabs, 106, 123
 Terminal delays, 27-28, 32
 Thomas, J. P., 125n.
 Traffic congestion, 78, 117, 119, 123,
 127-128, 131
 — statistics, 30, 33, 49, 50, 52-53,
 57, 122, 125, 126, 127
 Trade depression, 16, 22, 48, 50
 Traders and smaller stocks, 17, 18
 Tramways, 25-27, 78, 81, 117, 119,
 125, 135
 Transhipment, 27, 76
 Transitional periods, 16, 47, 69-70
 Travel habit, 17, 57
 Turntable, motor bus, 104
 Underground railways, 25, 118, 119,
 120, 121, 132
 " Undue Preference," 64

" Unfair " competition, 63
 United States, air transport, 43, 113
 — co-ordination, 101-107
 — horse transport, 31
 — long-distance buses, 20, 59-60
 — motor transport, 23, 31, 32-
 33, 35, 59-60
 — regulation, 64, 106-107
 — road and rail competition,
 58-60
 Vested interests, 80
 Victoria Station, 100
 Vienna, 123
 Wages, 62, 63
 Wales, 91
 " Way " trains, 105
 Wedgwood, Sir Ralph, 51, 66
 West Wales Commercial Motors,
 Ltd., 91
 Western National Omnibus Co., 75
 Western Valleys Motor Services,
 Ltd., 91
 Wilson, G. L., 17n., 23n., 35n., 64n.,
 107n., 116n.
 Workmen's tickets, 26, 50
 Yorkshire, 75n.
 Zone Rates, 57
 Zone Stations, 104

BOOKS TO READ.

PROPOSED LONDON AND PARIS RAILWAY: London and Paris in 2 hours 45 minutes, via a Channel Tunnel and a proposed new Railway. By WILLIAM COLLARD. Crown Quarto. 280 pp. and Map. **10s. 6d.**

The greatest political need of our time is a better understanding with France, and nothing can contribute more effectually towards this end than improved communication between Great Britain and her nearest neighbour on the Continent. The author here presents detailed facts and figures in support of his scheme, which already has the approval of many leading railway authorities.

THE BRITISH TRADE BOARDS SYSTEM: An Enquiry into its Operation. By DOROTHY SELLS, Ph.D. Demy 8vo. 304 pp. with 4 graphs. **12s. 6d.**

The Minimum Wage in various occupations has been considered and fixed by the Trade Boards established by the Act of 1909. It is frequently asked by persons concerned with reconstruction problems in the field of labour: "How has the Trade Board System developed in Great Britain, and how has it worked under the test of time and economic chaos?" This book is an attempt to answer the question in so far as it is possible to do so from available information.

A REVIEW OF ECONOMIC THEORY.

By EDWIN CANNAN, Emeritus Professor of Political Economy in the University of London. Demy 8vo. 460 pp. **16s.**

In this book Professor Cannan has been faithful to the principle which he followed at the London School of Economics—the principle that general economic theory can best be made intelligible by following its development from its simplest beginnings. The story told in his "Theories of Production and Distribution" is now retold, but in a much shorter form, so that room is found not only for starting the history of these theories at their birth and carrying it down to the present time, but also for a similar history of the theory of value, and for a chapter on "Aspirations and Tendencies," in which the drift of economic progress is discussed.

EMIGRATION FROM THE BRITISH ISLES with Special Reference to the Development of the Overseas Dominions.

W. A. CARROTHERS, Ph.D., Professor of Economics in the University of Saskatchewan. Demy 8vo. 350 pp. **15s.**

Contents: Early Settlement in Canada—Early Settlement in Australia—Malthusianism and Emigration—Emigration in the Malthusian Period, 1815-31—The Wakefield Theory of Colonisation—The Wakefield Theory in Practice: Australia—The Wakefield Theory in Practice: New Zealand—Canada and the Durham Report—Social Conditions Affecting Emigration in the Wakefield Period, 1831-50—The Irish Famine and Irish Emigration—The Lull in Emigration, 1850-78—Depression and Emigration, 1878-97—Emigration and the Unity of the Empire, 1897-1914—The War and Emigration, 1914-1929—Special Emigration Problems: (a) Women; (b) Children; (c) Juveniles—The Migration Problem To-day.

P. S. KING & SON, LTD.,
14 GREAT SMITH STREET, LONDON, S.W.1.

BOOKS TO READ.

INDIAN RAILWAYS: Rates and Regulations.

By N. B. MEHTA, Ph.D., with an Introduction by W. TETLEY STEPHENSON, M.A. Demy 8vo. 200 pp. **10s. 6d.**

The purpose of this book is to examine the rates policy pursued by the railways in India, and the power of the Government to control it. Three facts are emphasized: the preponderant financial stake of the State in the railways, the obsolescence of the theory of the automatic regulation of railway rates by competition or by the law of supply and demand, and the need, therefore, of a more rigorous yet enlightened policy of State control.

Lloyd's List.—" . . . should be of more than ordinary value to all who have interests, whether financial or otherwise, in the many changes already made in the administration of these railways."

THE RÔLE OF THE STATE IN THE PROVISION OF RAILWAYS.

By H. M. JAGTIANI, M.Sc. With an Introduction by Sir WILLIAM ACWORTH, K.C.S.I. Demy 8vo. 156 pp. **8s. 6d.**

It is the purpose of this book to investigate what system is best adapted to lead to a healthy development of railways in a country and to see to what extent the association of the State is necessary. For this purpose three countries are examined: England, Prussia and India.

New Statesman.—" Mr. Jagtiani's book is principally a short and clearly written account of the development and organization of railways in three countries—England, Prussia, and India. . . . His book is well worth study by those interested in the problems of railway control and ownership in Great Britain."

HISTORY OF FACTORY LEGISLATION.

By B. L. HUTCHINS and A. HARRISON, D.Sc., with a Preface by Right Hon. SIDNEY WEBB, LL.B. *Third Edition*, revised, with a new Chapter. Demy 8vo. 298 pp. **9s.**

This book contains a brief description of the origin of Factory Legislation and a full history of its development from 1800 onwards.

Originally published in 1903, it was the first systematic and complete analysis of its subject and ranks to-day as a standard work of reference.

DOCK LABOUR AND DECASUALISATION.

By E. C. P. LASCELLES and S. S. BULLOCK. Demy 8vo. 194 pp. **10s. 6d.**

The Times Literary Supplement.—" . . . in this book we have a mass of evidence . . . together with a wide survey of the docking industry in general. The ordinary reader will find much of interest and value here, while to those more directly concerned with dock labour the book is indispensable. . . . A considerable collection of statistics and diagrams finishes a most interesting book."

P. S. KING & SON, LTD.,
14 GREAT SMITH STREET, LONDON, S.W.1.

